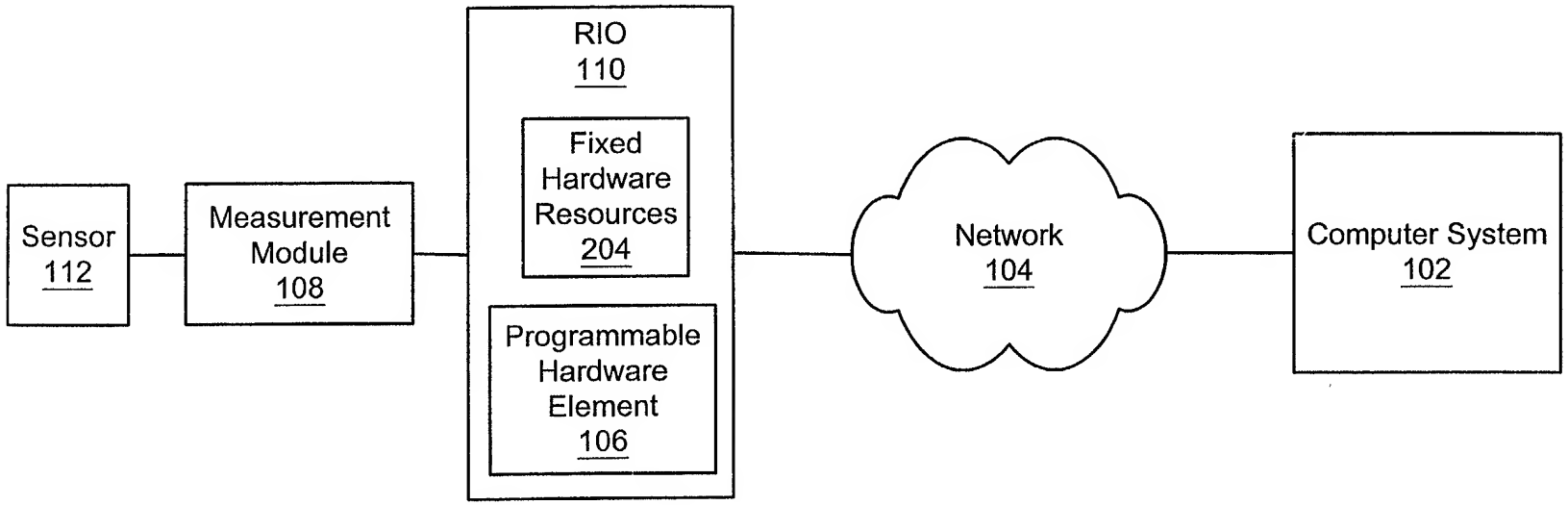
RIO
110
Fixed
Hardware
Resources
204
Programmable
Hardware
Element
106
Sensor
112
Measurement
Module
108
Network
104
Computer System
102

Figure 1

Agent Tessot

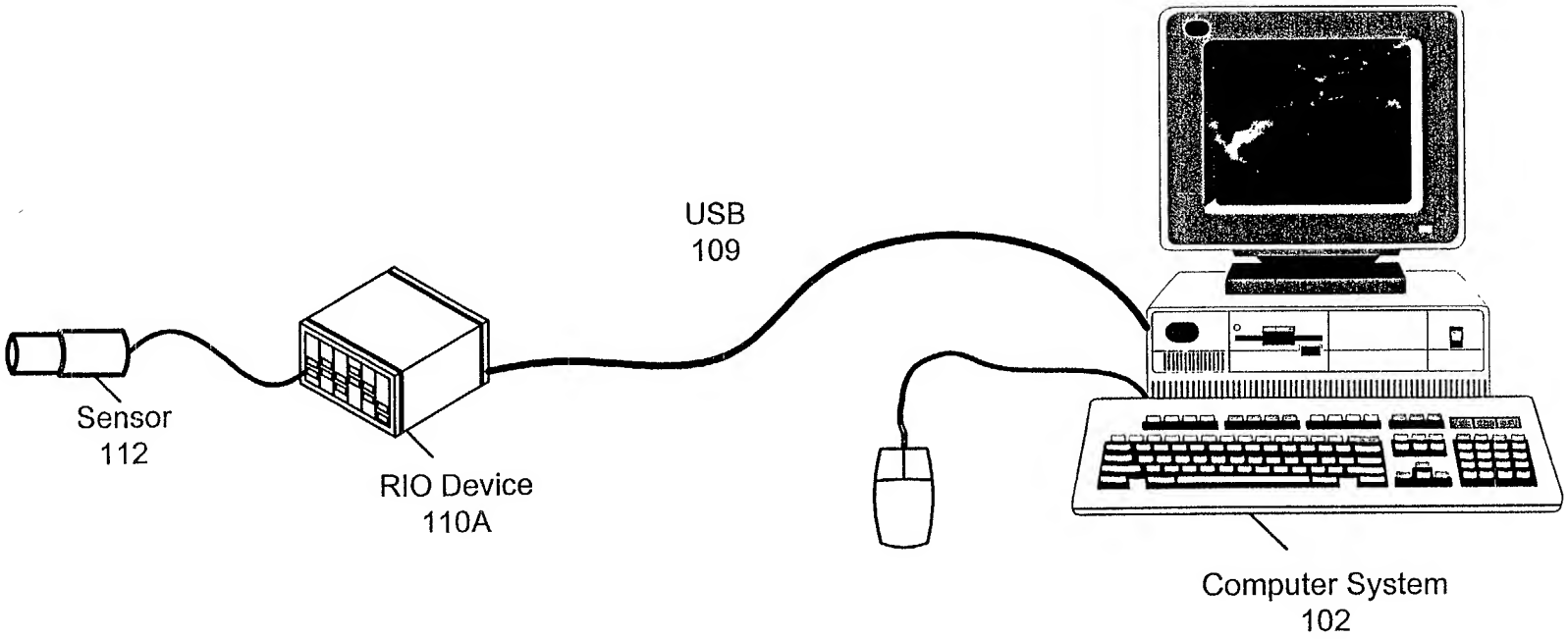

Figure 1A

T0620T T695S00T

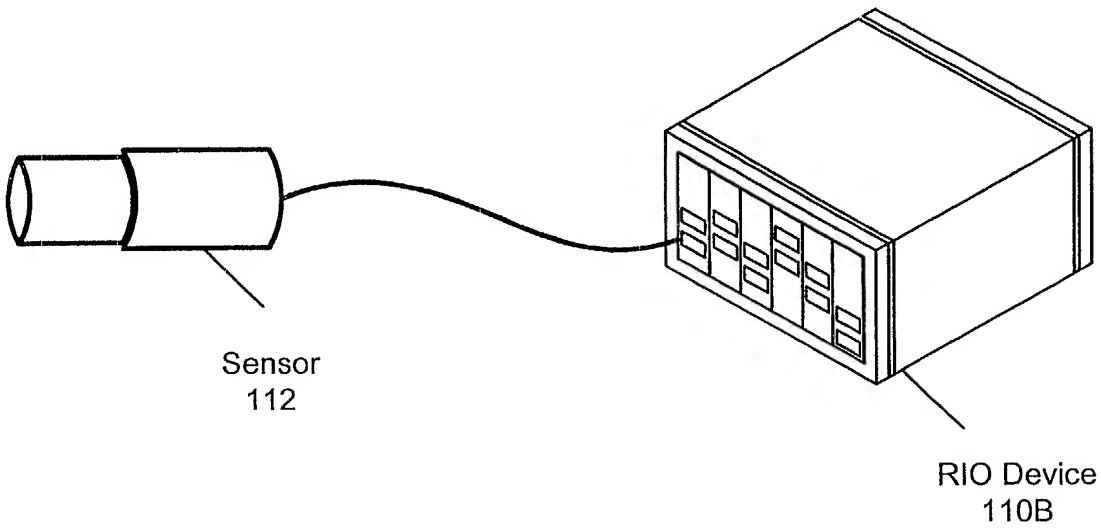

Figure 1B

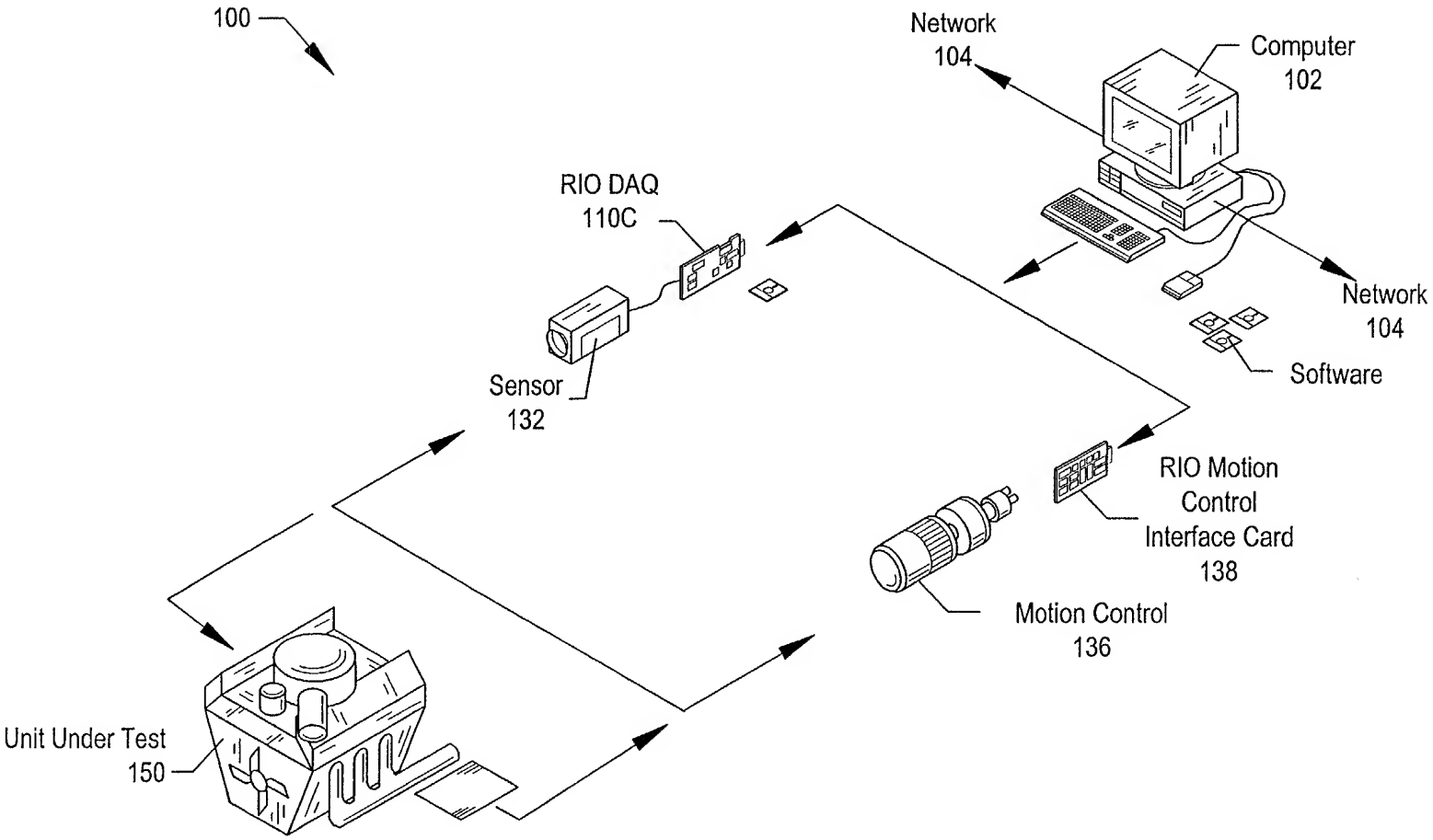
100
Network
104
Computer
102
RIO DAQ
110C
Network
104
Software
Sensor
132
RIO Motion
Control
Interface Card
138
Motion Control
136
Unit Under Test
150

Figure 1C

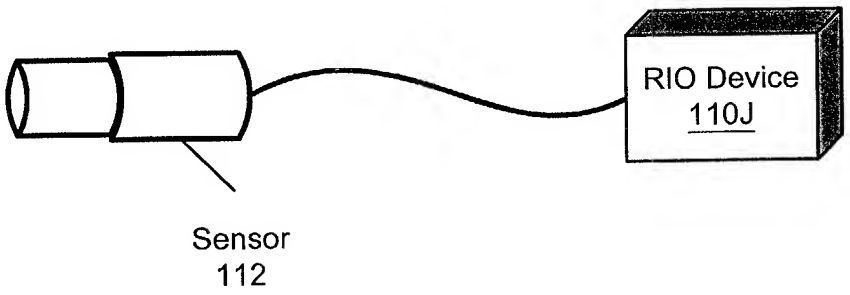

Figure 1E

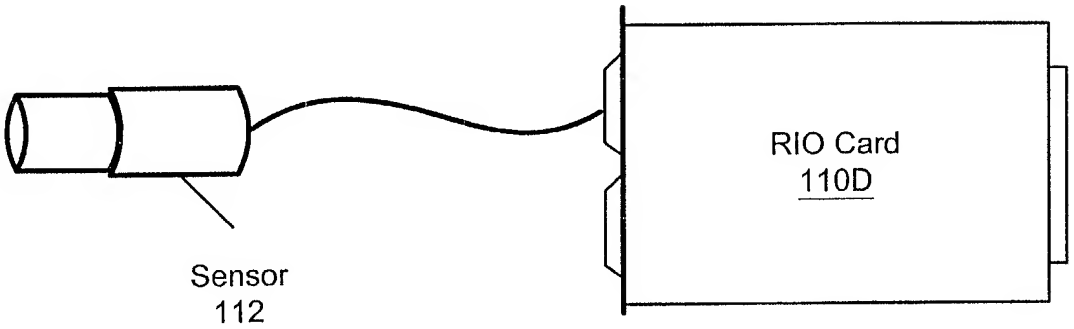

Figure 1D

Toggot Tassaat

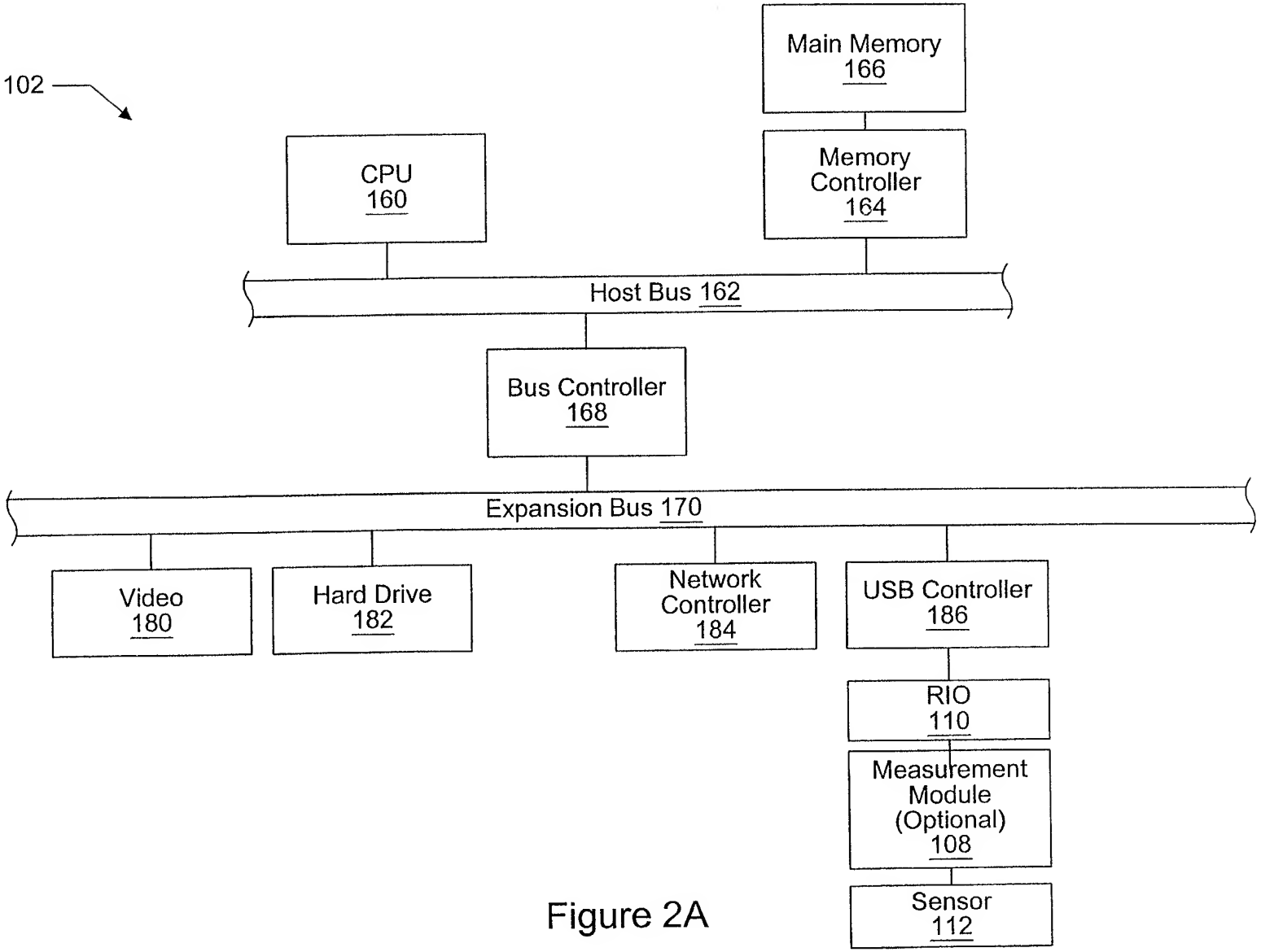

Figure 2A

Total Assist

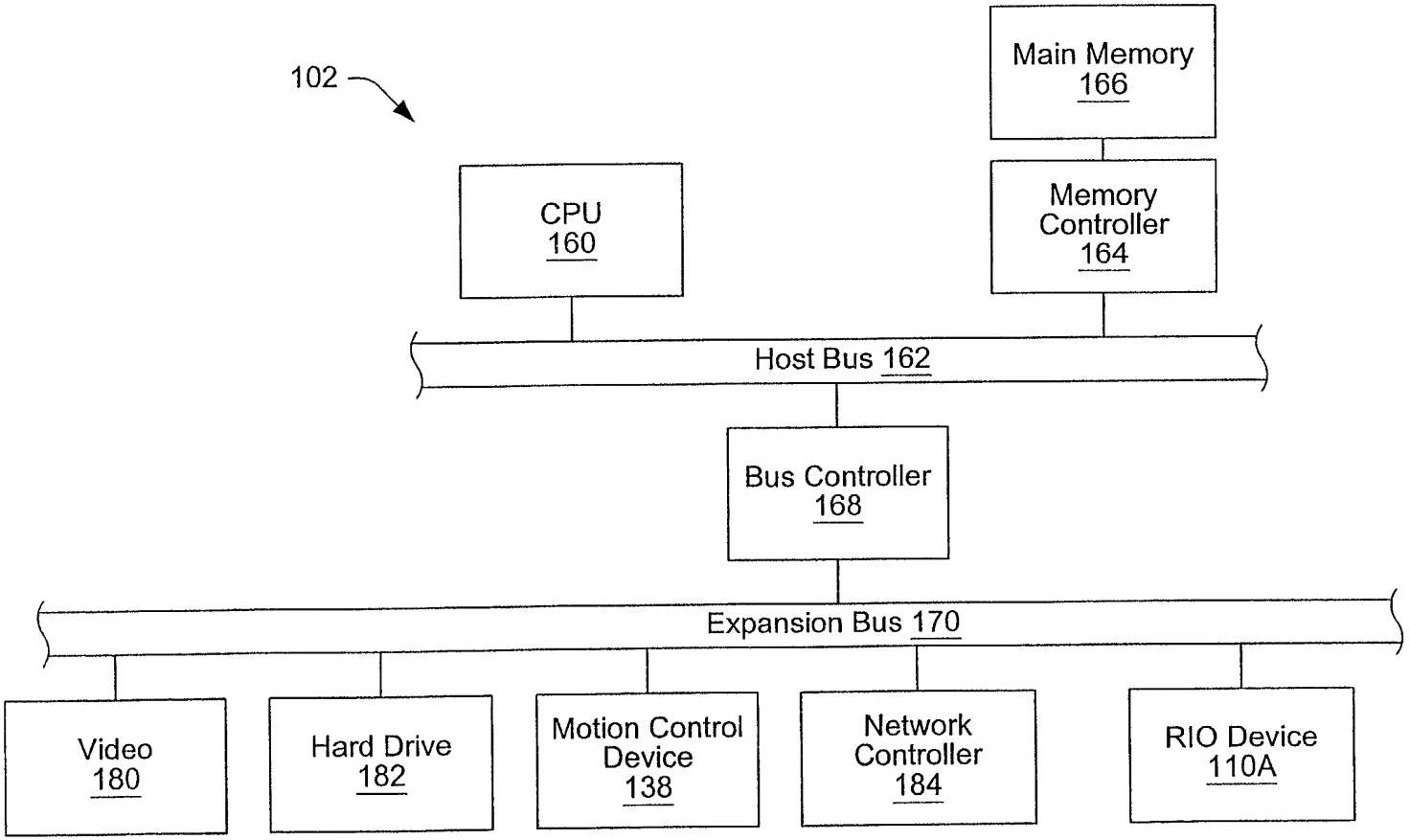

Figure 2B

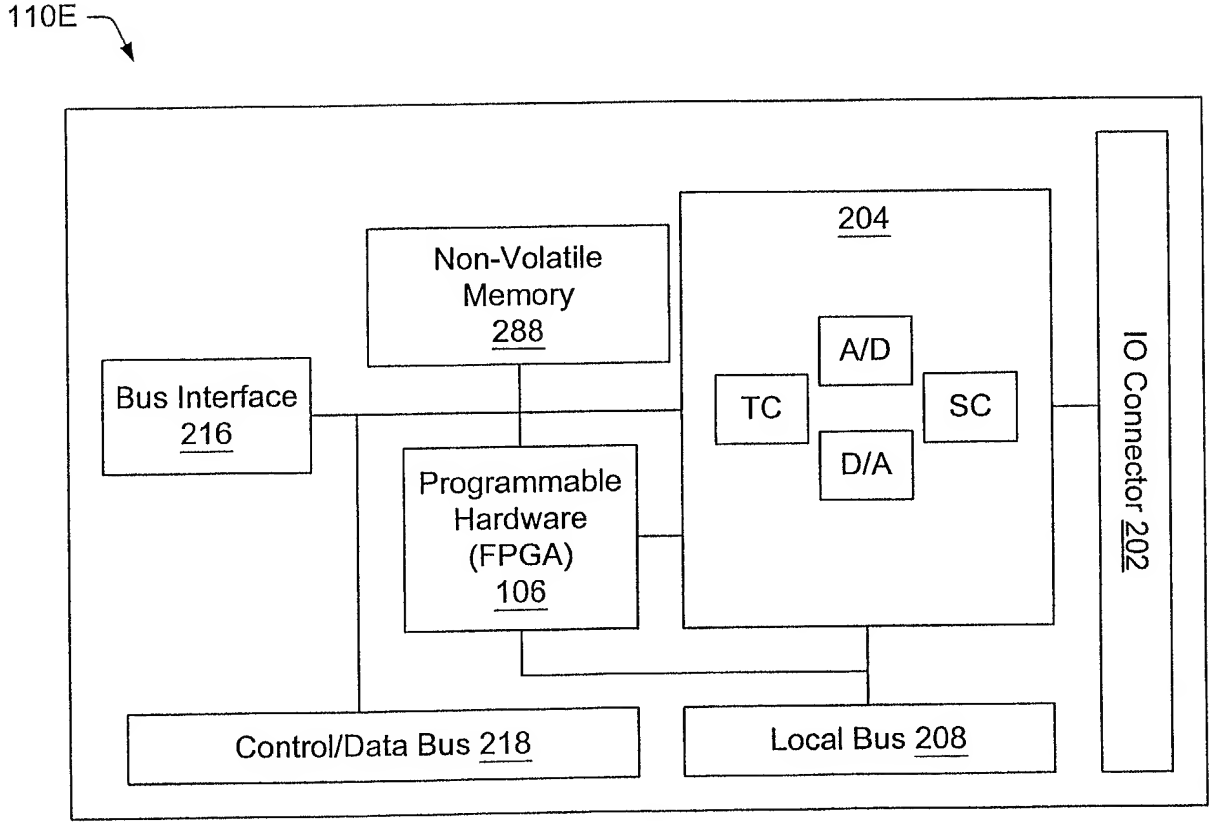
110E
204
Non-Volatile Memory 288
Bus Interface 216
Programmable Hardware (FPGA) 106
A/D
TC
SC
D/A
IO Connector 202
Control/Data Bus 218
Local Bus 208

Fig. 3A

Tobacco Tobacco

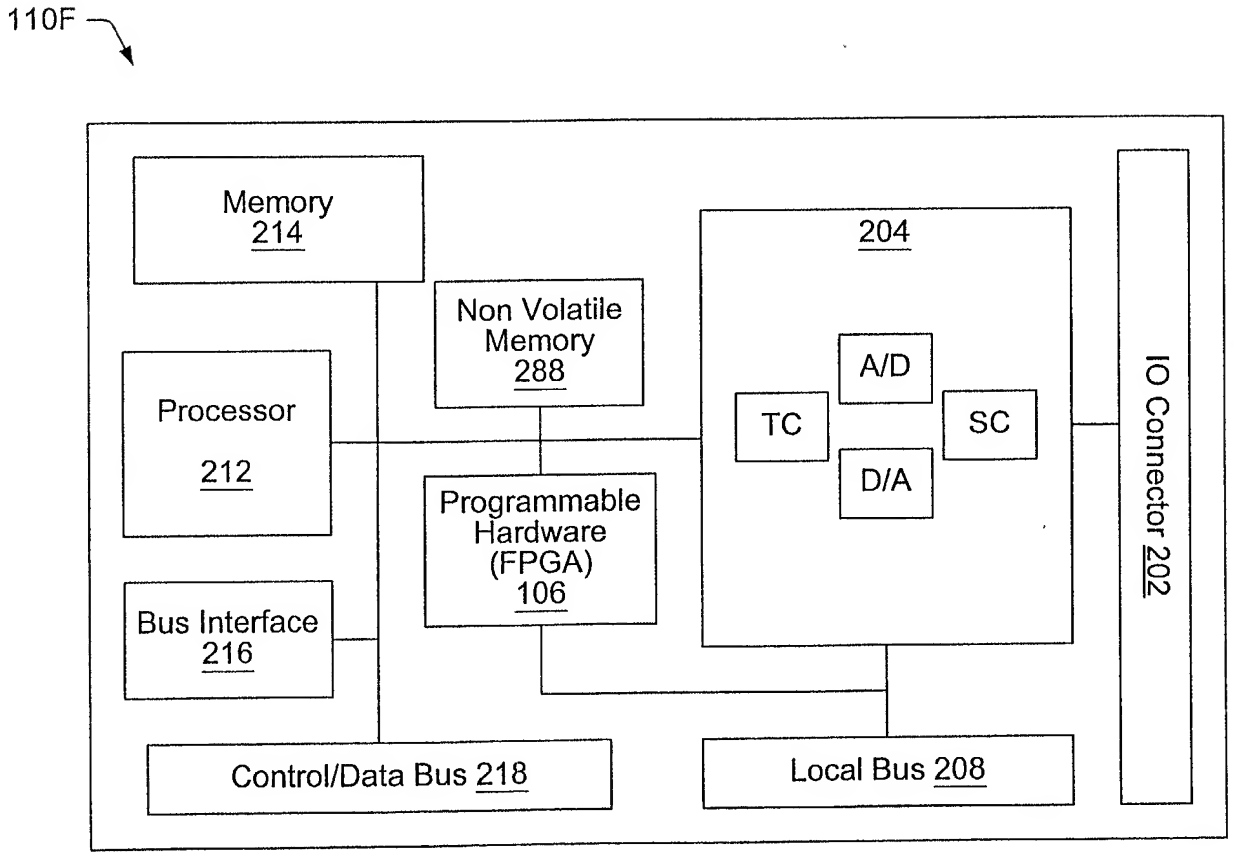

Fig. 3B

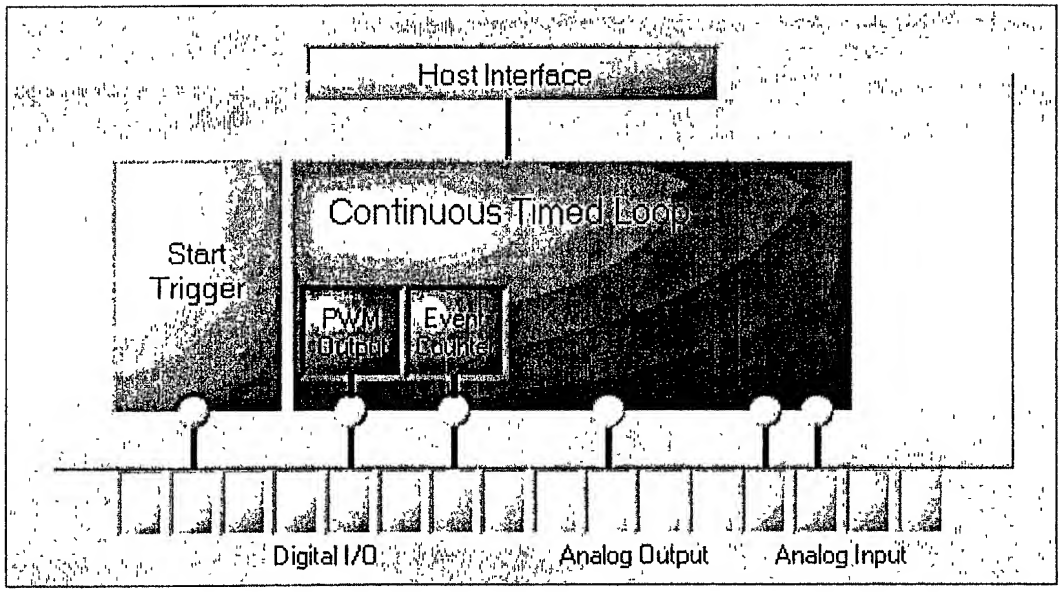
Host Interface
Continuous Timed Loop
Start Trigger
PWM
Event Counter
Digital I/O
Analog Output
Analog Input

Figure 3C

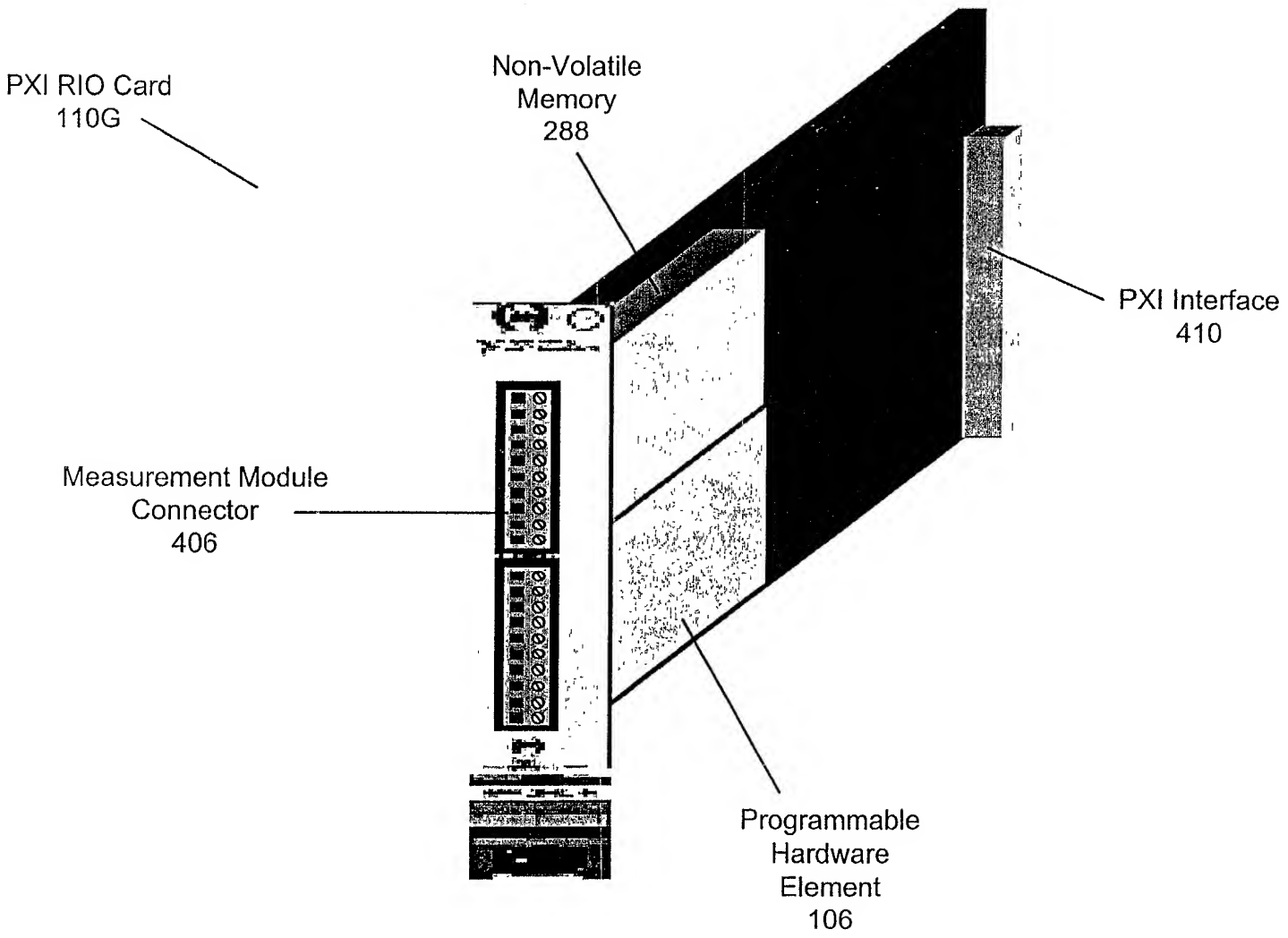
PXI RIO Card
110G
Non-Volatile
Memory
288
PXI Interface
410
Measurement Module
Connector
406
Programmable
Hardware
Element
106

Figure 4

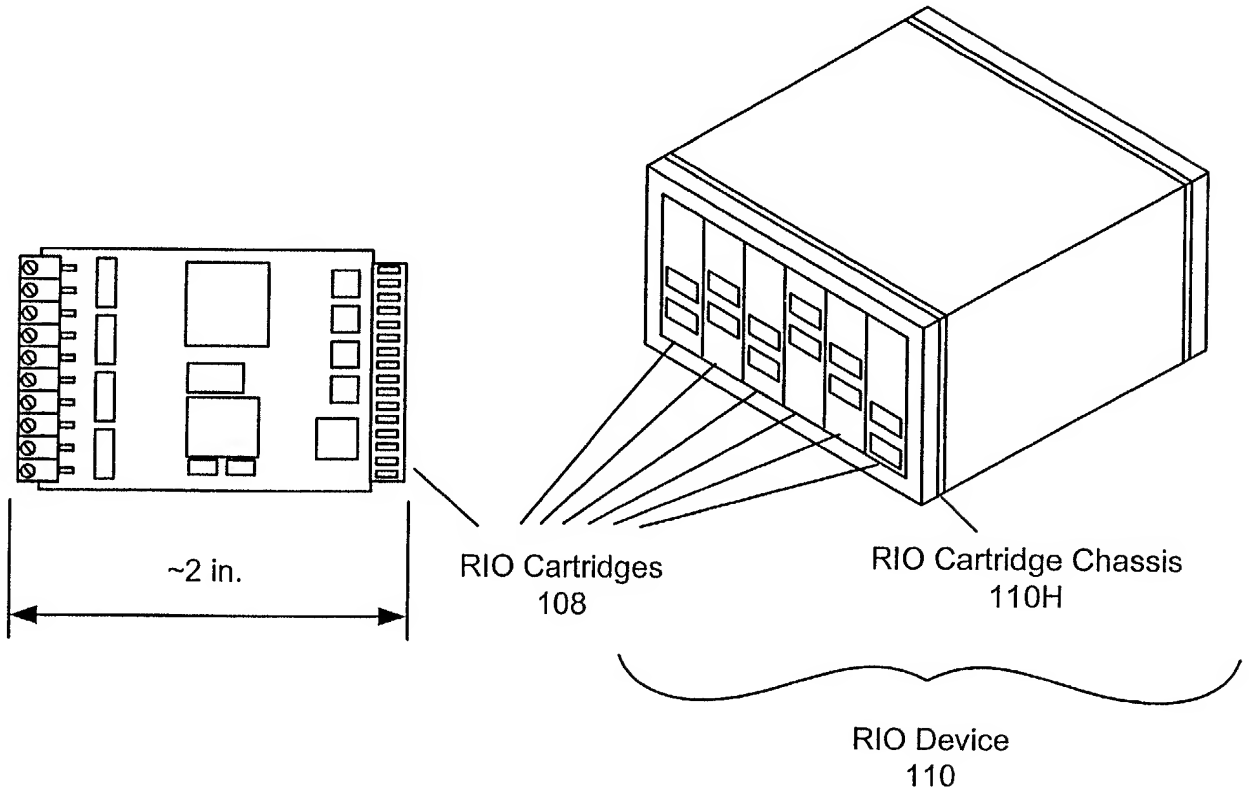
~2 in.
RIO Cartridges
108
RIO Cartridge Chassis
110H
RIO Device
110

Figure 5A

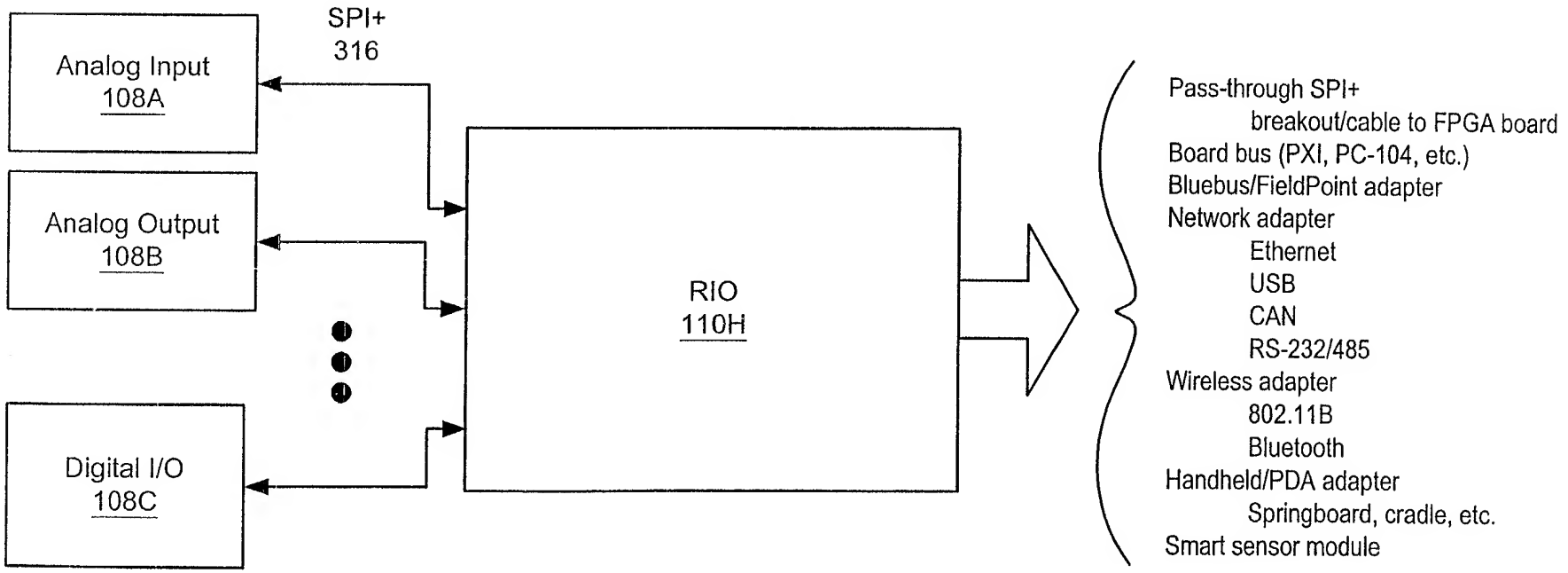
SPI+
316
Analog Input
108A
Analog Output
108B
Digital I/O
108C
RIO
110H
Pass-through SPI+
breakout/cable to FPGA board
Board bus (PXI, PC-104, etc.)
Bluebus/FieldPoint adapter
Network adapter
Ethernet
USB
CAN
RS-232/485
Wireless adapter
802.11B
Bluetooth
Handheld/PDA adapter
Springboard, cradle, etc.
Smart sensor module

Figure 5B

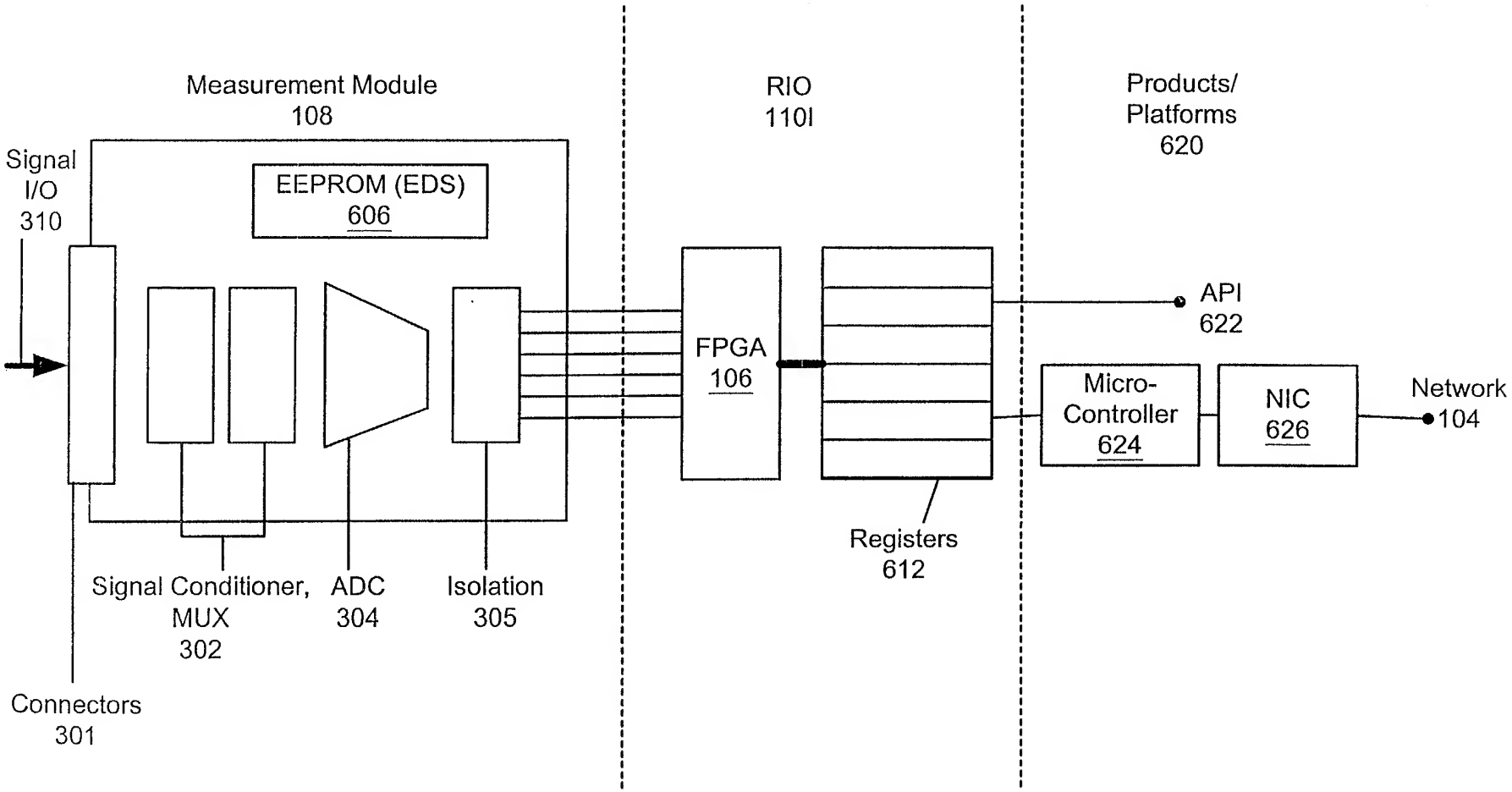
Measurement Module
108
RIO
110I
Products/
Platforms
620
Signal
I/O
310
EEPROM (EDS)
606
FPGA
106
API
622
Micro-
Controller
624
NIC
626
Network
104
Registers
612
Signal Conditioner,
MUX
302
ADC
304
Isolation
305
Connectors
301

Figure 6

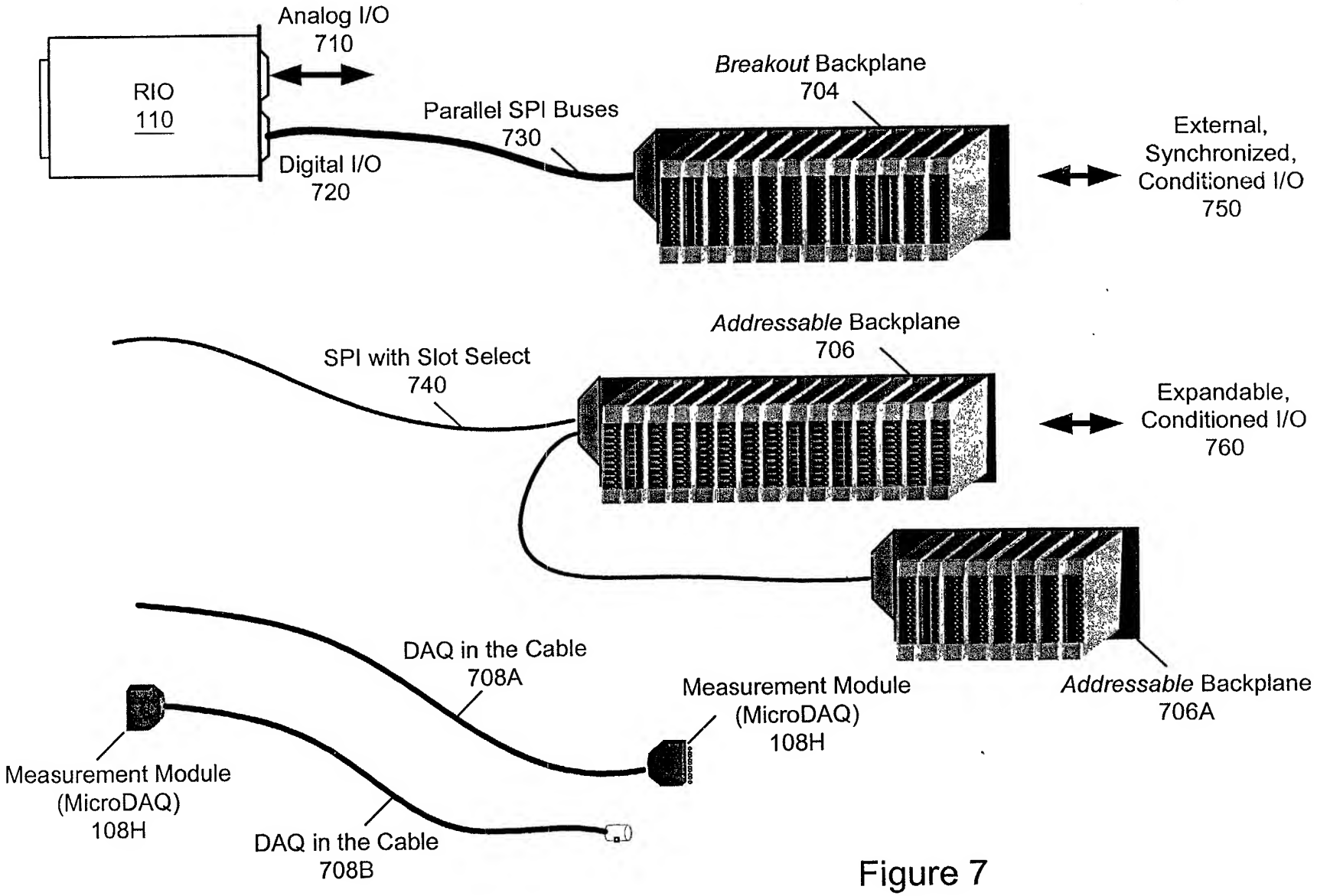
Analog I/O
710
RIO
110
Digital I/O
720
Parallel SPI Buses
730
Breakout Backplane
704
External,
Synchronized,
Conditioned I/O
750
SPI with Slot Select
740
Addressable Backplane
706
Expandable,
Conditioned I/O
760
DAQ in the Cable
708A
Measurement Module
(MicroDAQ)
108H
Addressable Backplane
706A
Measurement Module
(MicroDAQ)
108H
DAQ in the Cable
708B

Figure 7

Toast Tassoot

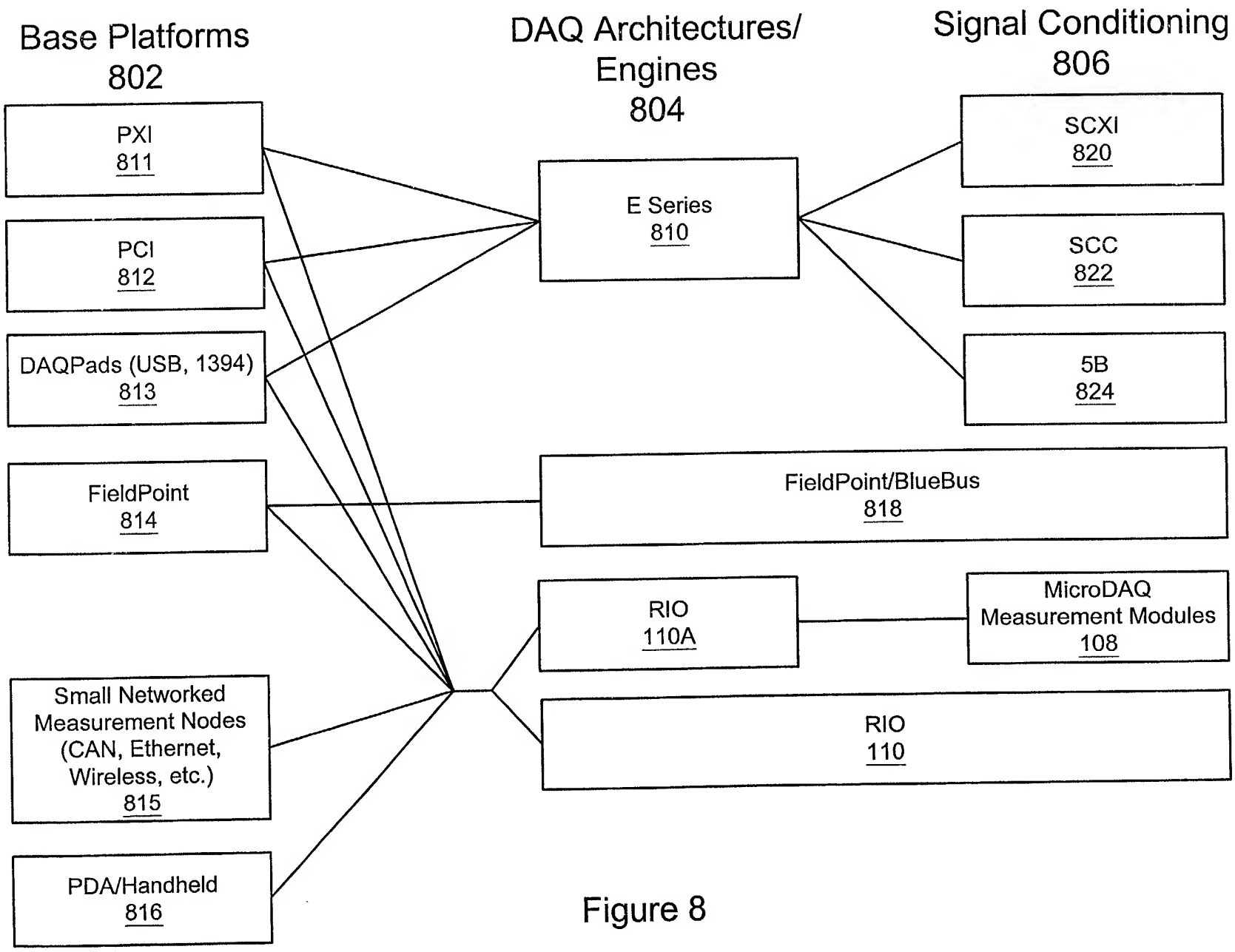

Figure 8

Exhibit 1025, page 15

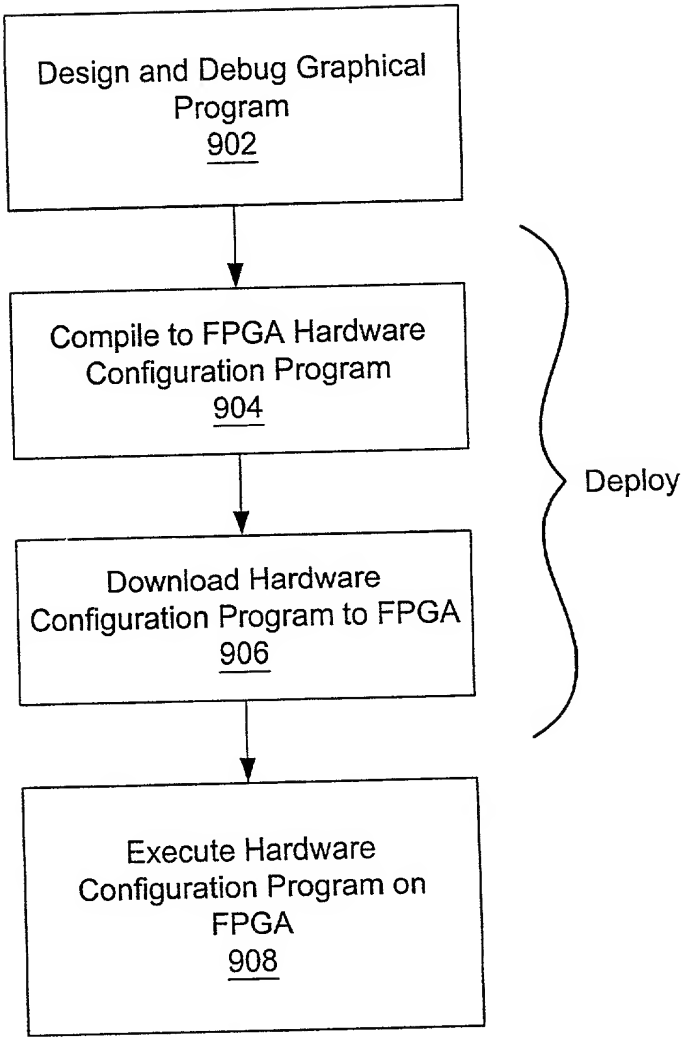

Figure 9

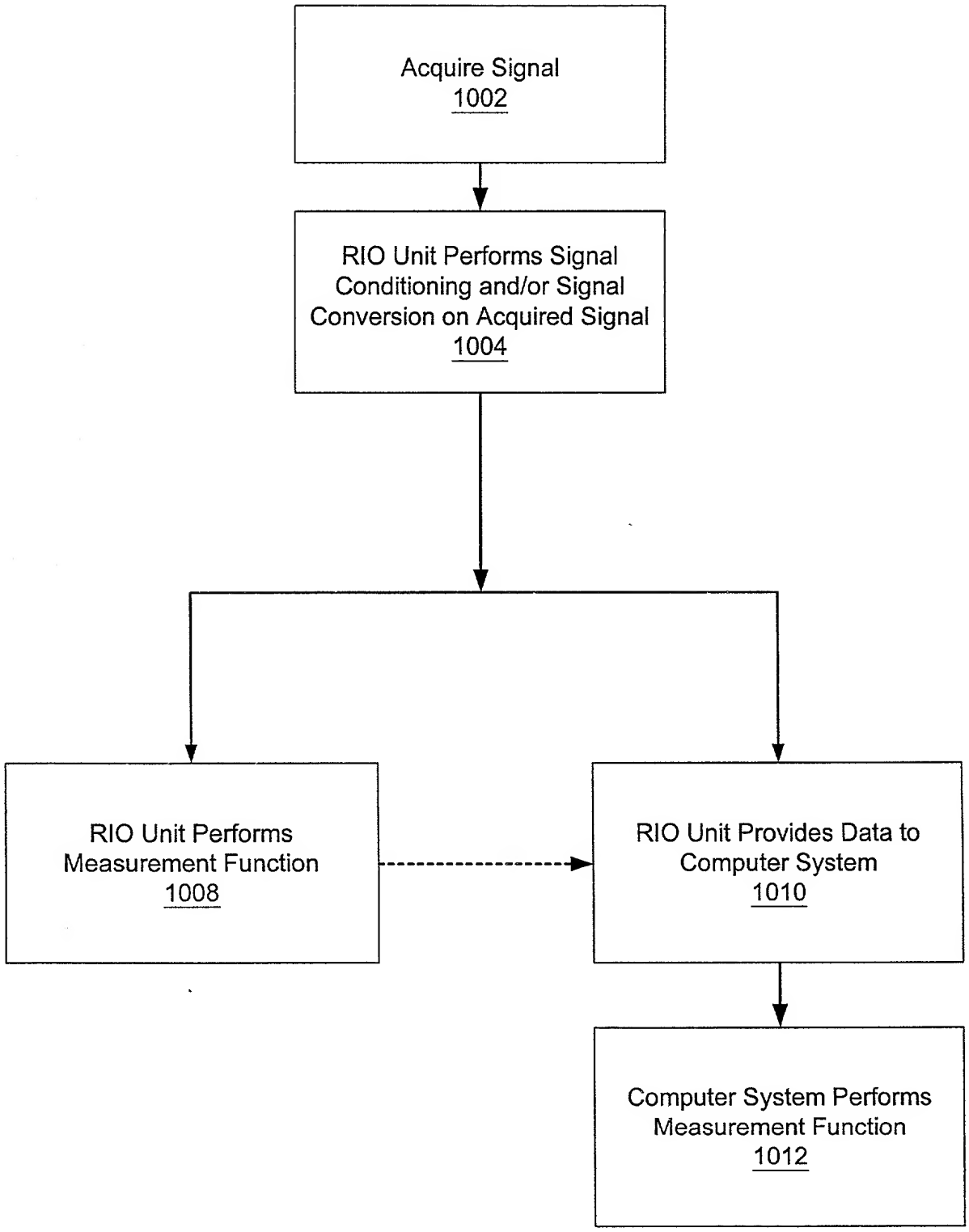
Acquire Signal
1002
RIO Unit Performs Signal Conditioning and/or Signal Conversion on Acquired Signal
1004
RIO Unit Performs Measurement Function
1008
RIO Unit Provides Data to Computer System
1010
Computer System Performs Measurement Function
1012

Figure 10

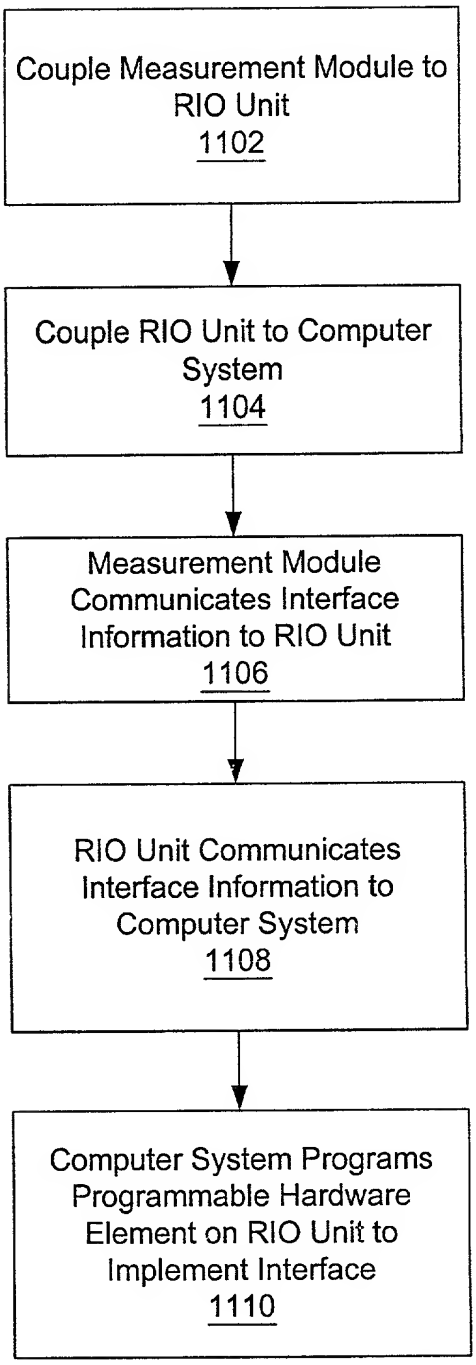
Couple Measurement Module to RIO Unit
1102
Couple RIO Unit to Computer System
1104
Measurement Module Communicates Interface Information to RIO Unit
1106
RIO Unit Communicates Interface Information to Computer System
1108
Computer System Programs Programmable Hardware Element on RIO Unit to Implement Interface
1110

Figure 11A

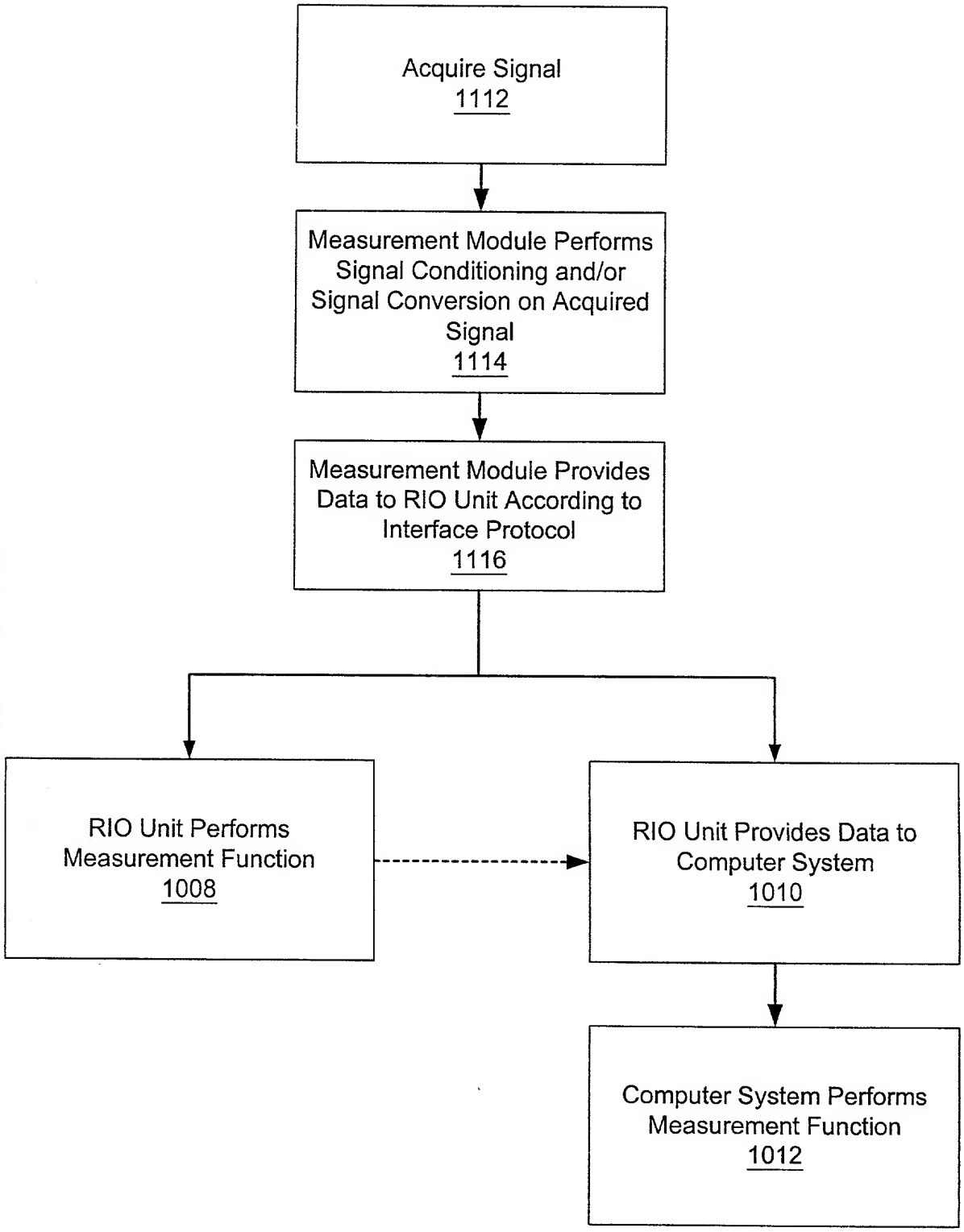
Acquire Signal
1112
Measurement Module Performs Signal Conditioning and/or Signal Conversion on Acquired Signal
1114
Measurement Module Provides Data to RIO Unit According to Interface Protocol
1116
RIO Unit Performs Measurement Function
1008
RIO Unit Provides Data to Computer System
1010
Computer System Performs Measurement Function
1012

Figure 11B

Toggle Fullscreen

Figure 12

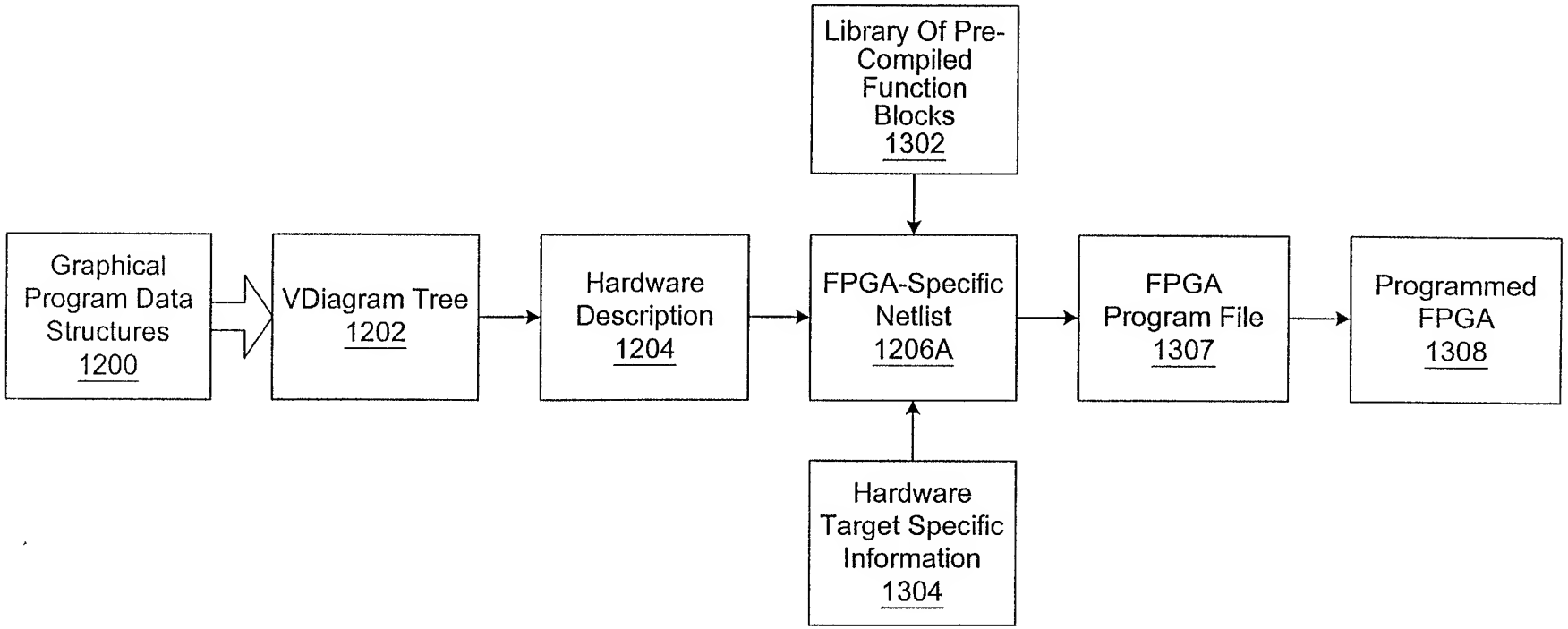
Library Of Pre-Compiled Function Blocks 1302
Graphical Program Data Structures 1200
VDiagram Tree 1202
Hardware Description 1204
FPGA-Specific Netlist 1206A
FPGA Program File 1307
Programmed FPGA 1308
Hardware Target Specific Information 1304

Figure 13

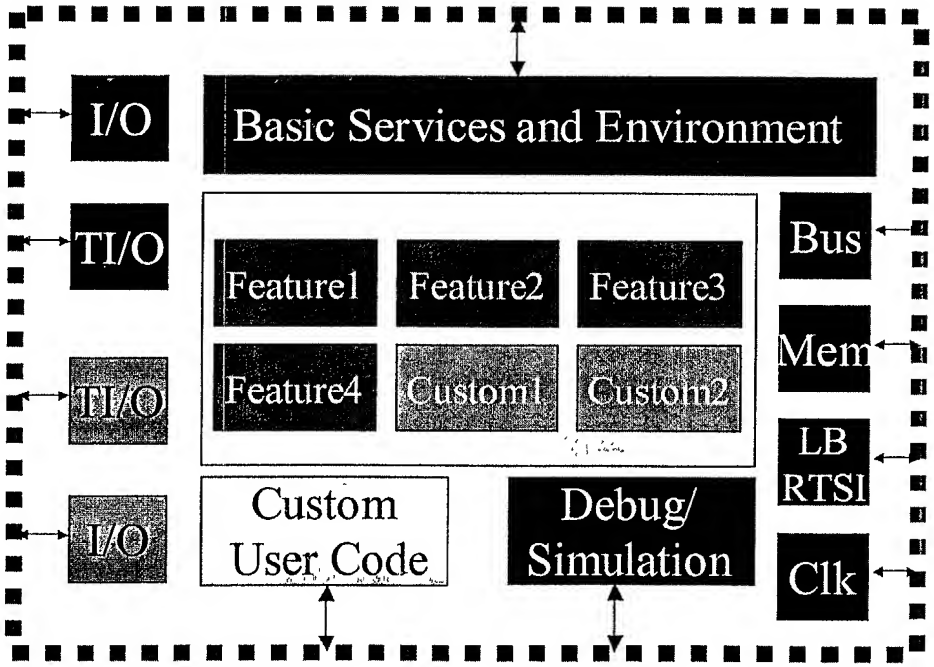
I/O
Basic Services and Environment
TI/O
Feature1
Feature2
Feature3
Bus
Feature4
Custom1
Custom2
Mem
TI/O
LB
RTSI
I/O
Custom
User Code
Debug/
Simulation
Clk

Figure 14

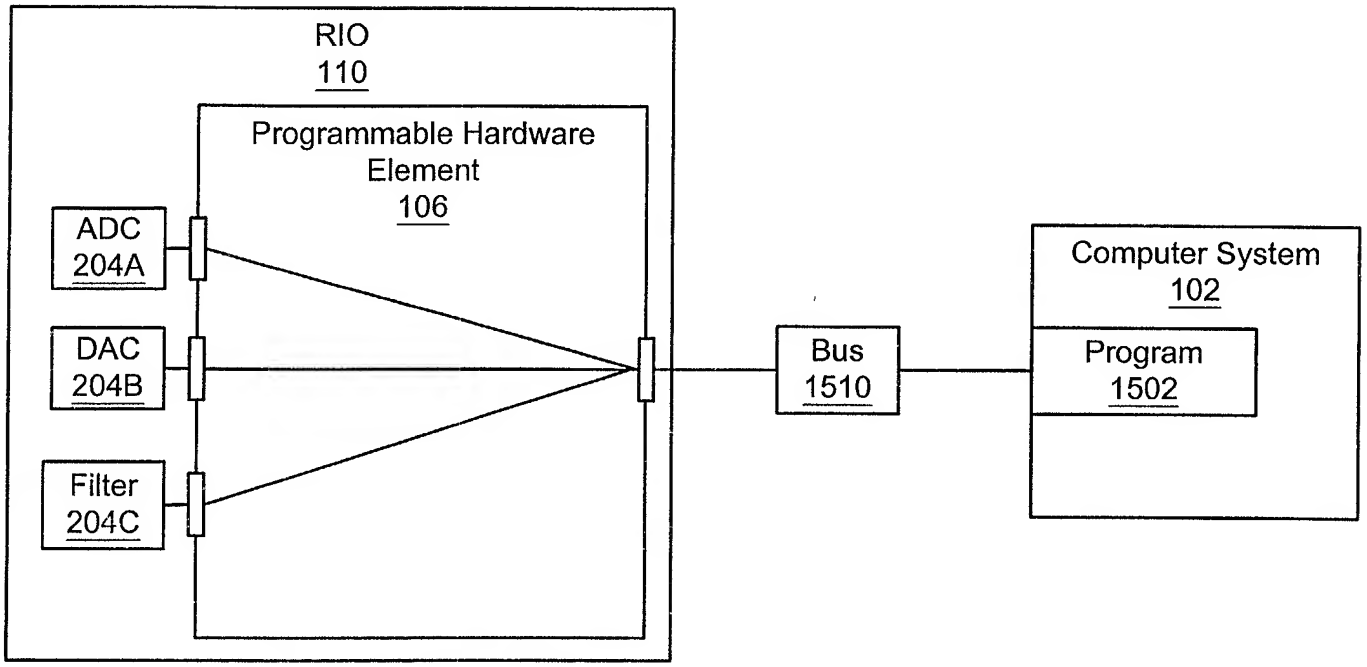
RIO
110
Programmable Hardware
Element
106
ADC
204A
DAC
204B
Filter
204C
Bus
1510
Computer System
102
Program
1502

Figure 15

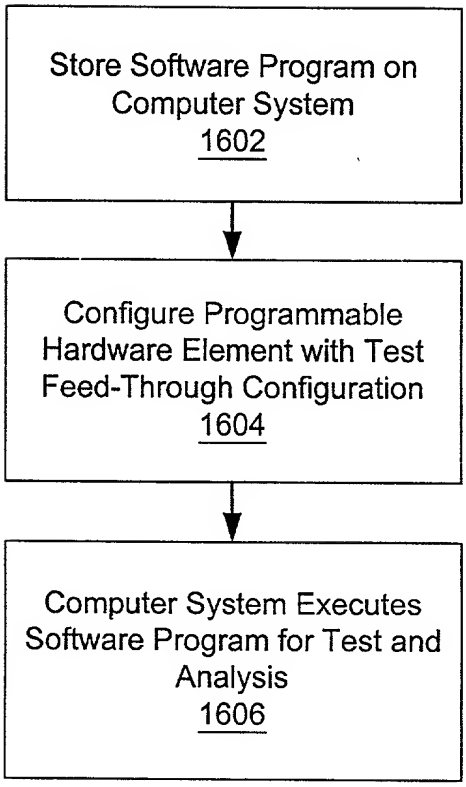
Store Software Program on Computer System
1602
Configure Programmable Hardware Element with Test Feed-Through Configuration
1604
Computer System Executes Software Program for Test and Analysis
1606

Figure 16

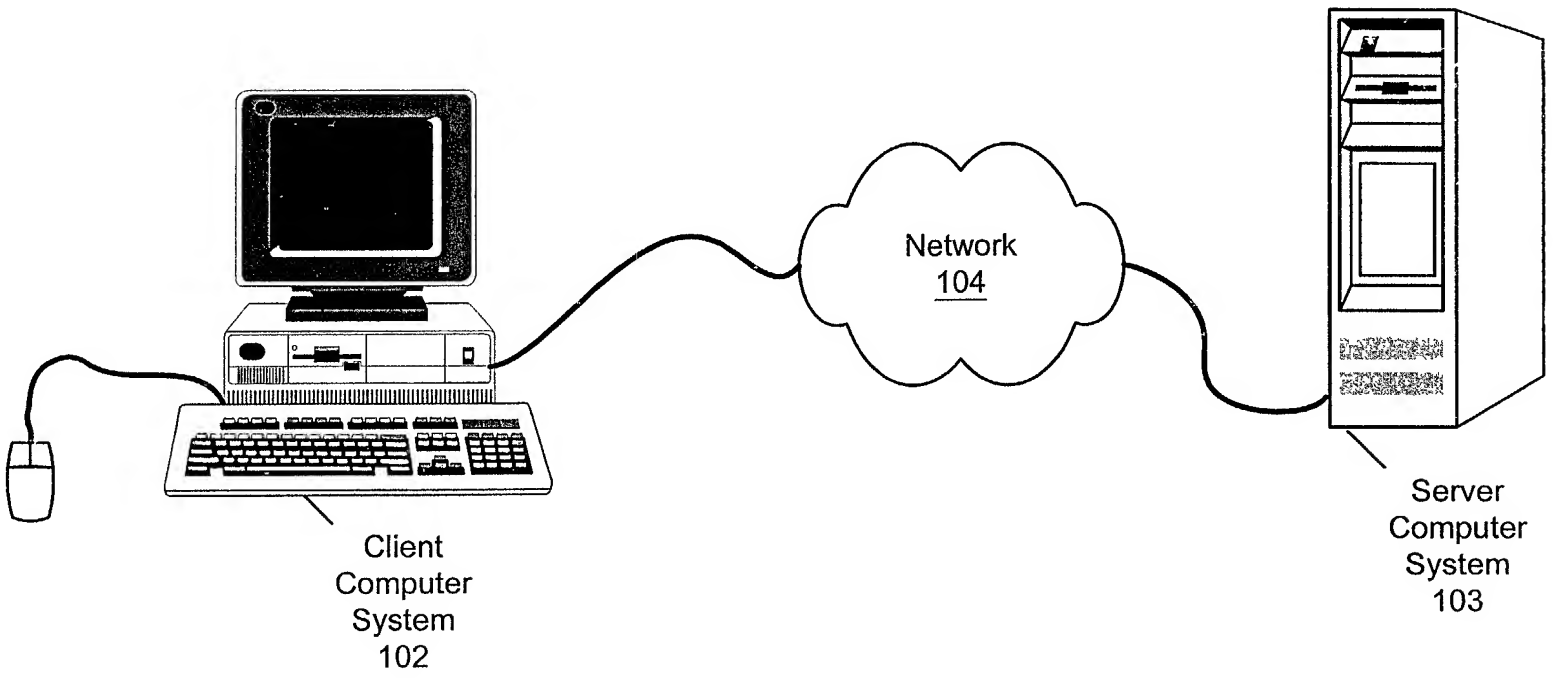
Network
104
Client
Computer
System
102
Server
Computer
System
103

Figure 17

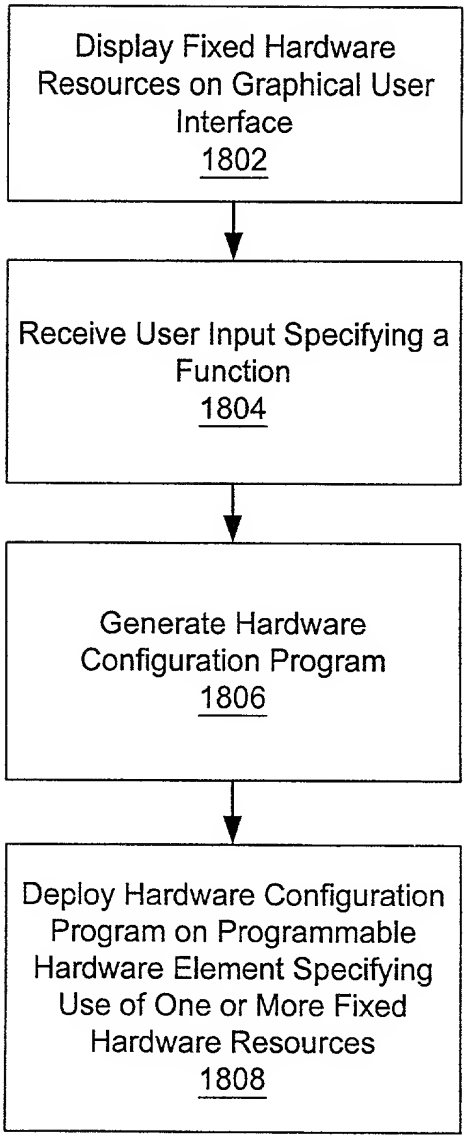
Display Fixed Hardware Resources on Graphical User Interface
1802
Receive User Input Specifying a Function
1804
Generate Hardware Configuration Program
1806
Deploy Hardware Configuration Program on Programmable Hardware Element Specifying Use of One or More Fixed Hardware Resources
1808

Figure 18

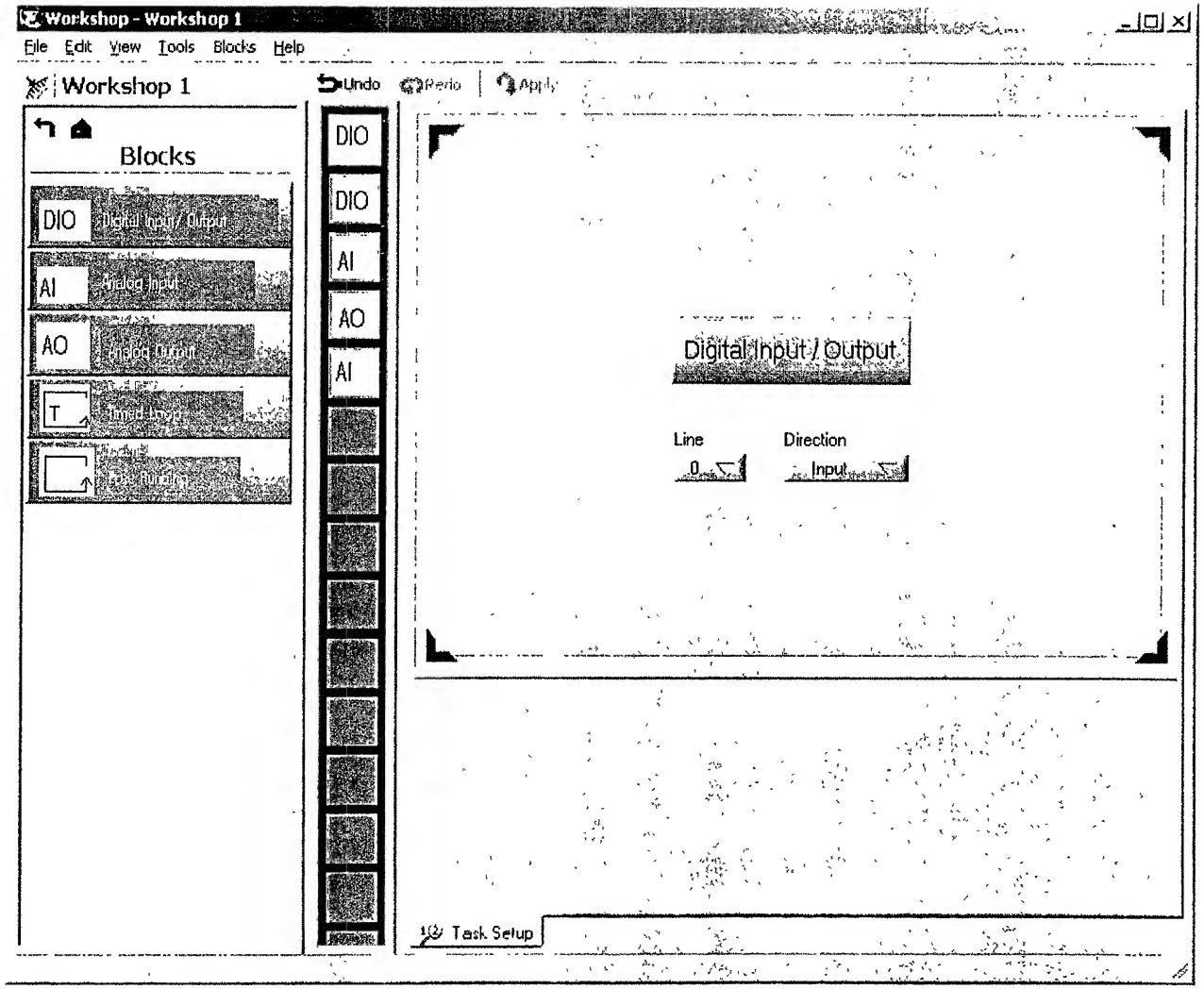
Workshop - Workshop 1
File Edit View Tools Blocks Help
Workshop 1
Undo
Blocks
DIO
Digital Input / Output
AI
Analog Input
AO
Analog Output
DIO
DIO
AI
AO
AI
Digital Input / Output
Line
0
Direction
Input
Task Setup

Figure 19A

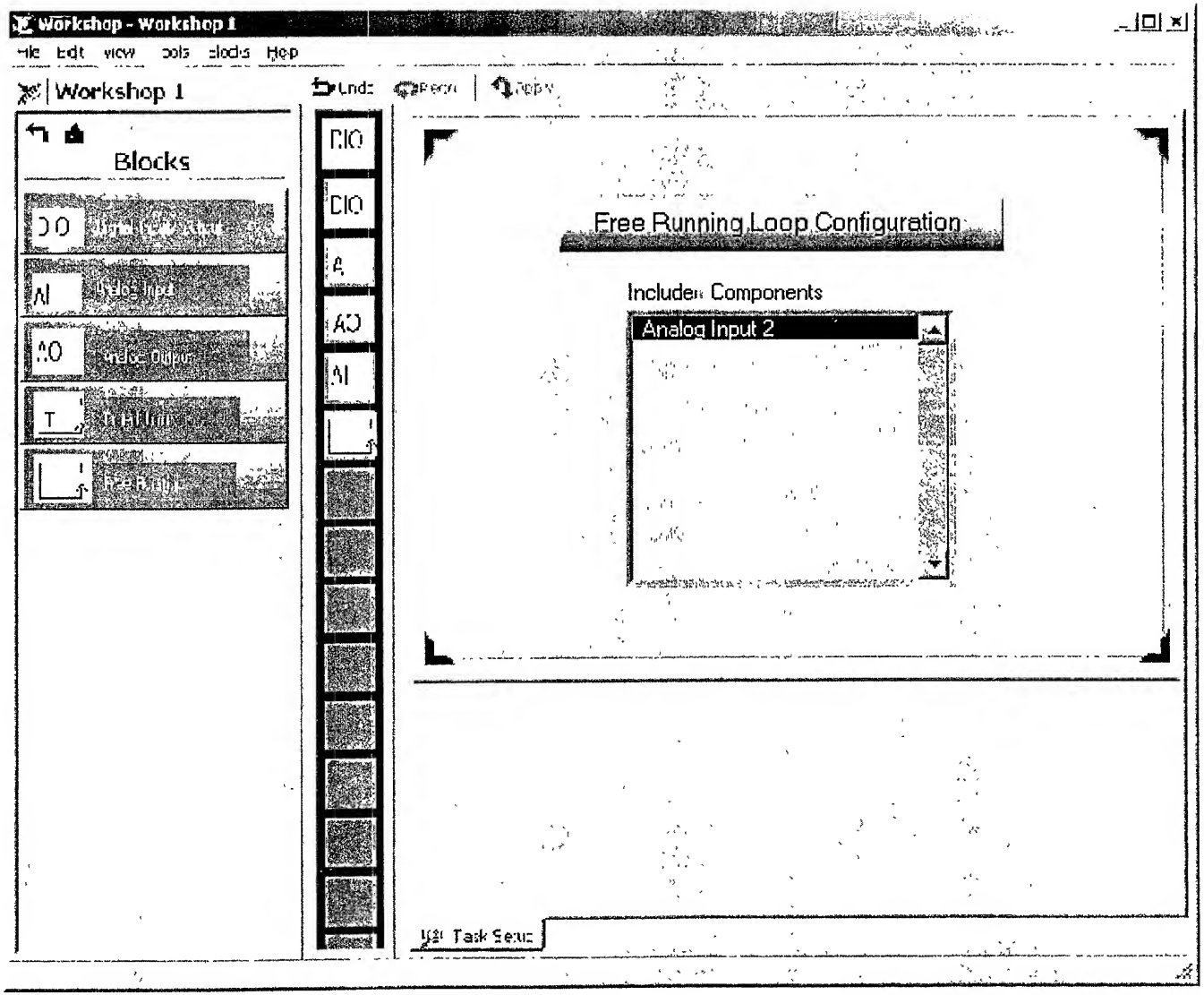
Workshop - Workshop 1
File Edit View Tools Blocks Help
Workshop 1
Undo
Redo
Copy
Blocks
DIO
AO
AI
Free Running Loop Configuration
Included Components
Analog Input 2
Task Setup

Figure 19B

Toggle Translation

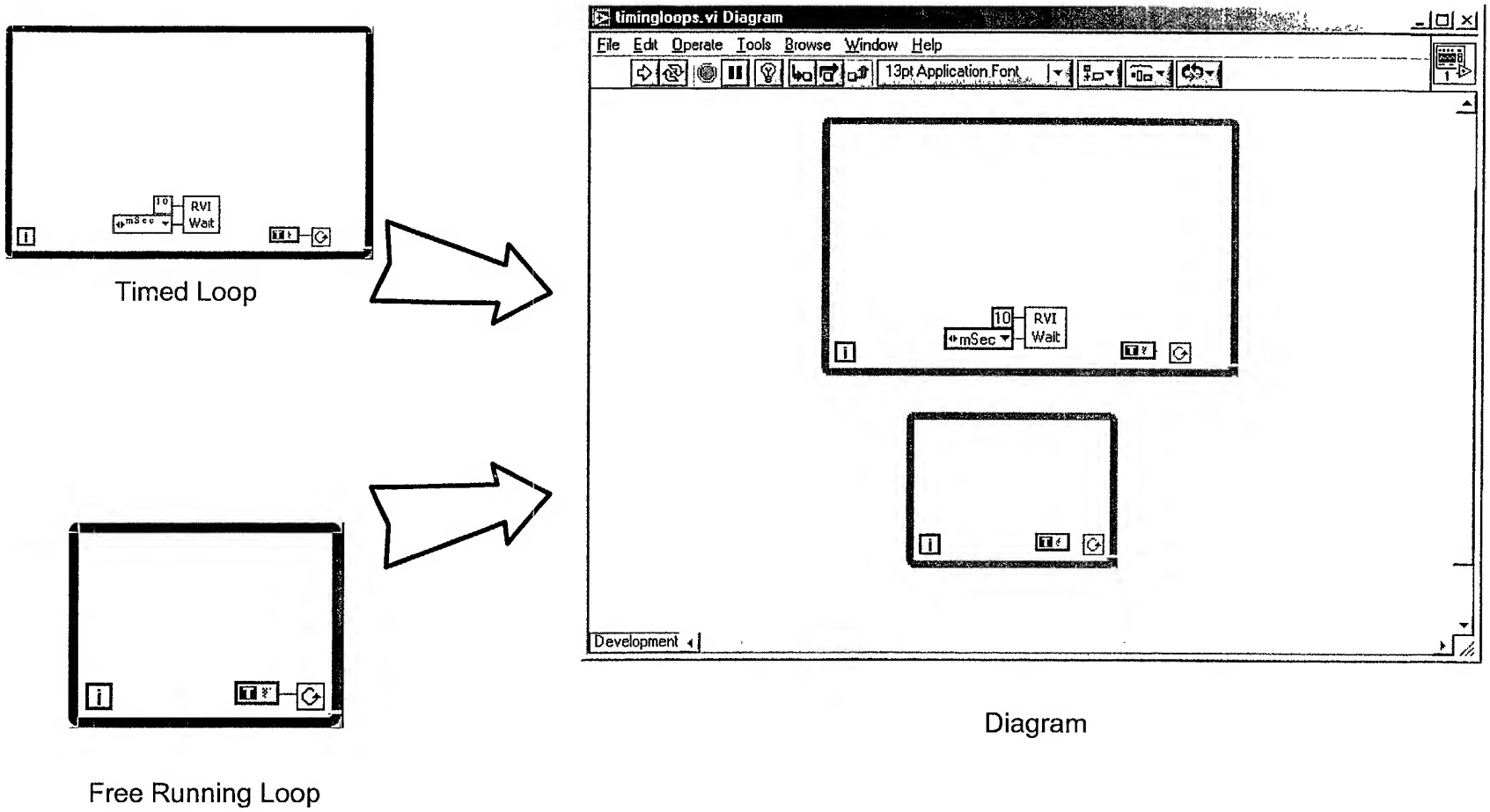

Figure 19C

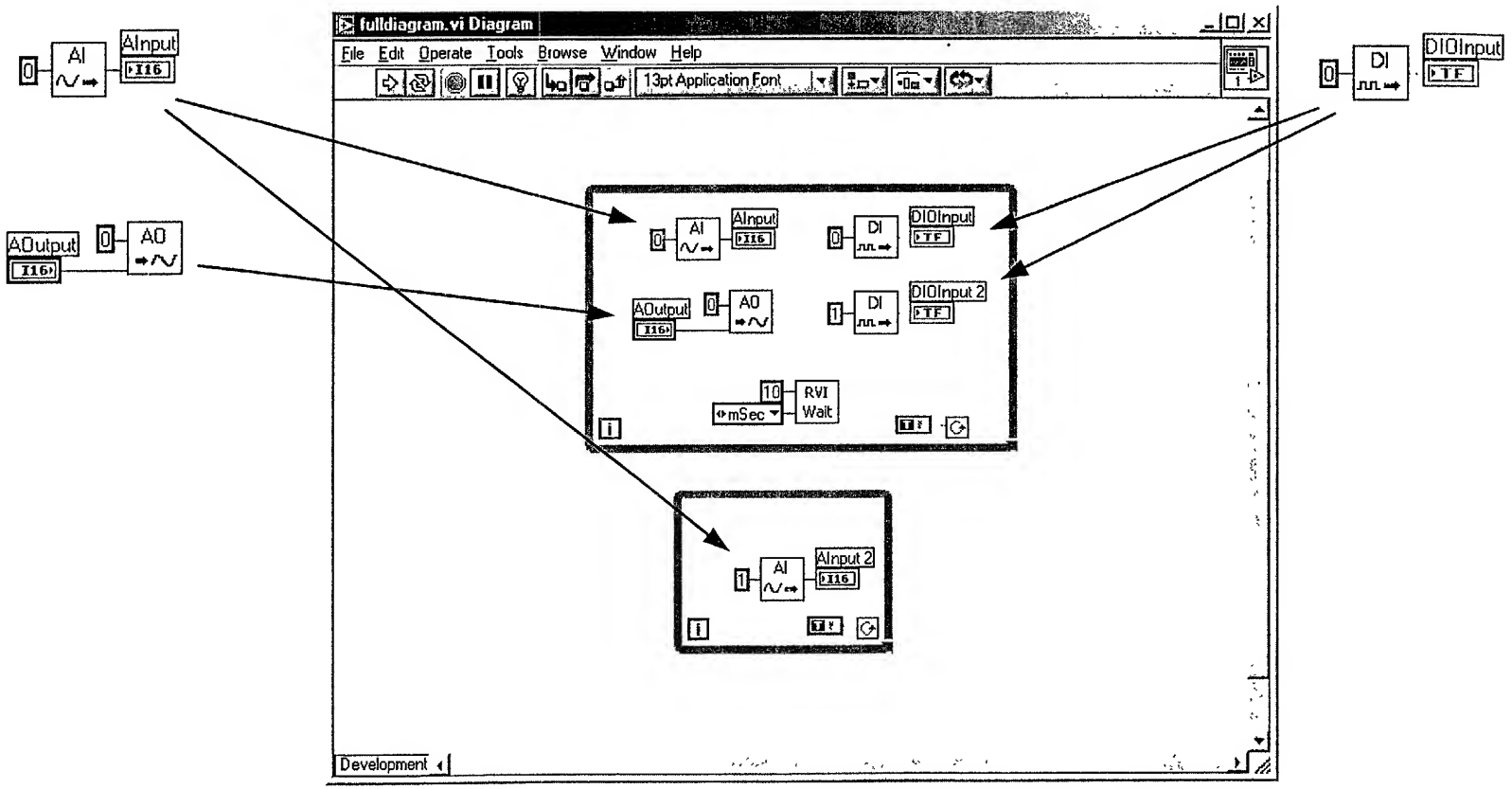
fulldiagram.vi Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
AI
AInput
I16
AOutput
I16
AO
DI
DIOInput
TF
DIOInput 2
10
mSec
RVI
Wait
AInput 2
Development

Figure 19D

Toggle Fullscreen

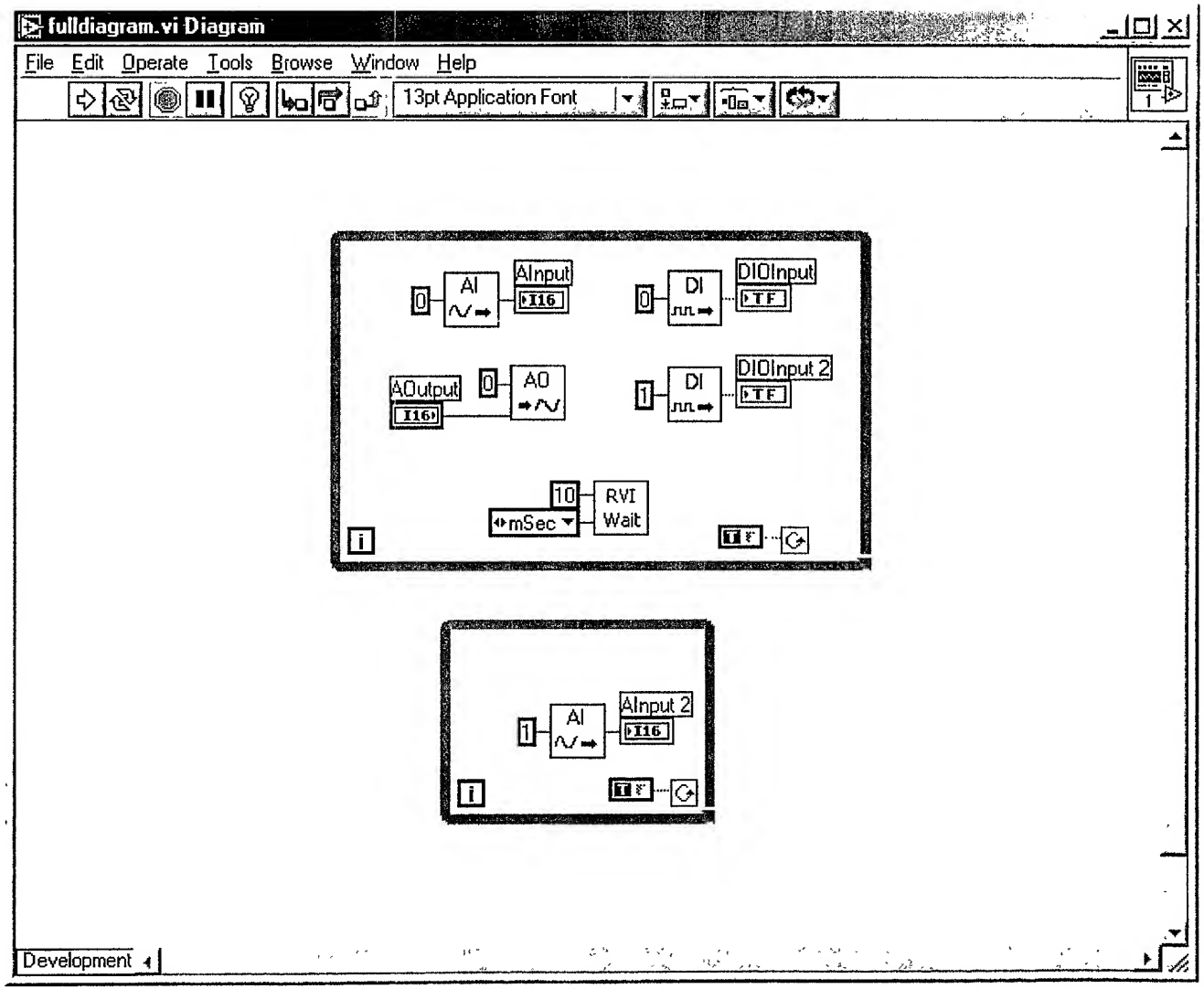

Figure 19E

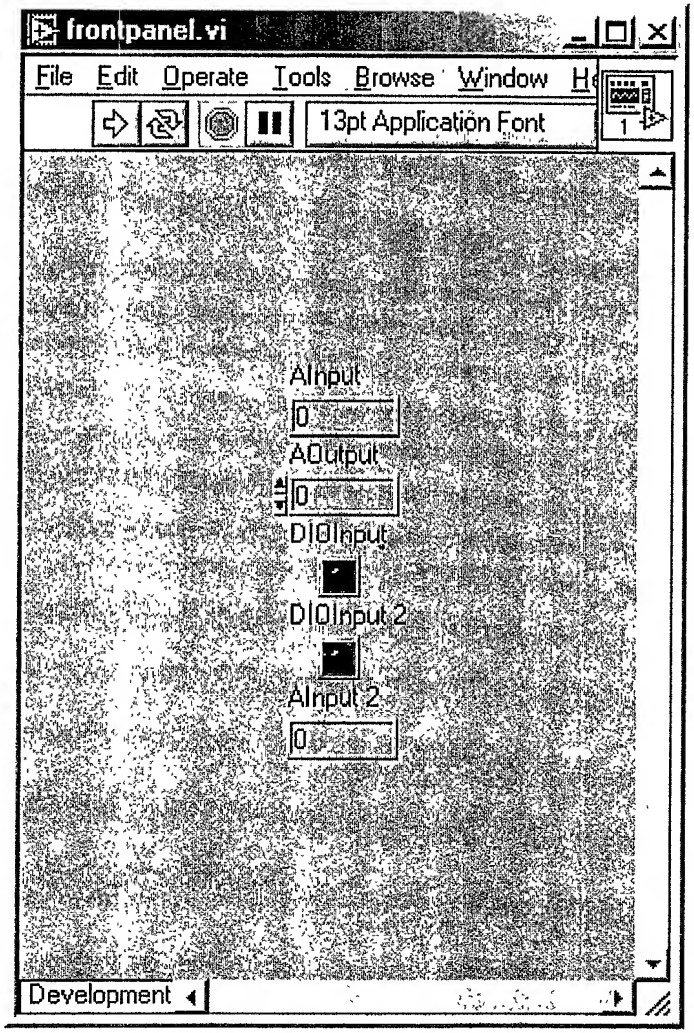
frontpanel.vi
File Edit Operate Tools Browse Window H
13pt Application Font
AInput
0
AOutput
0
DIOInput
DIOInput 2
AInput 2
0
Development

Figure 19F

Tocad Testsoft

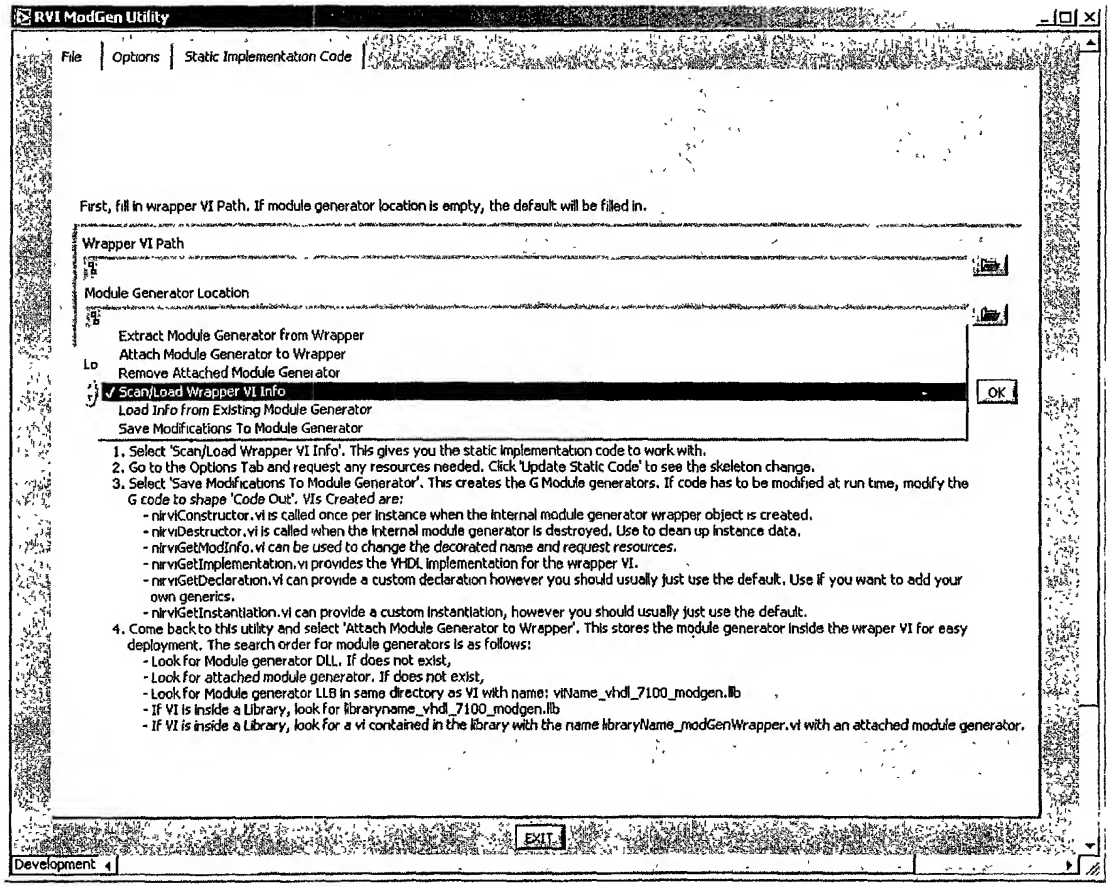

Figure 20

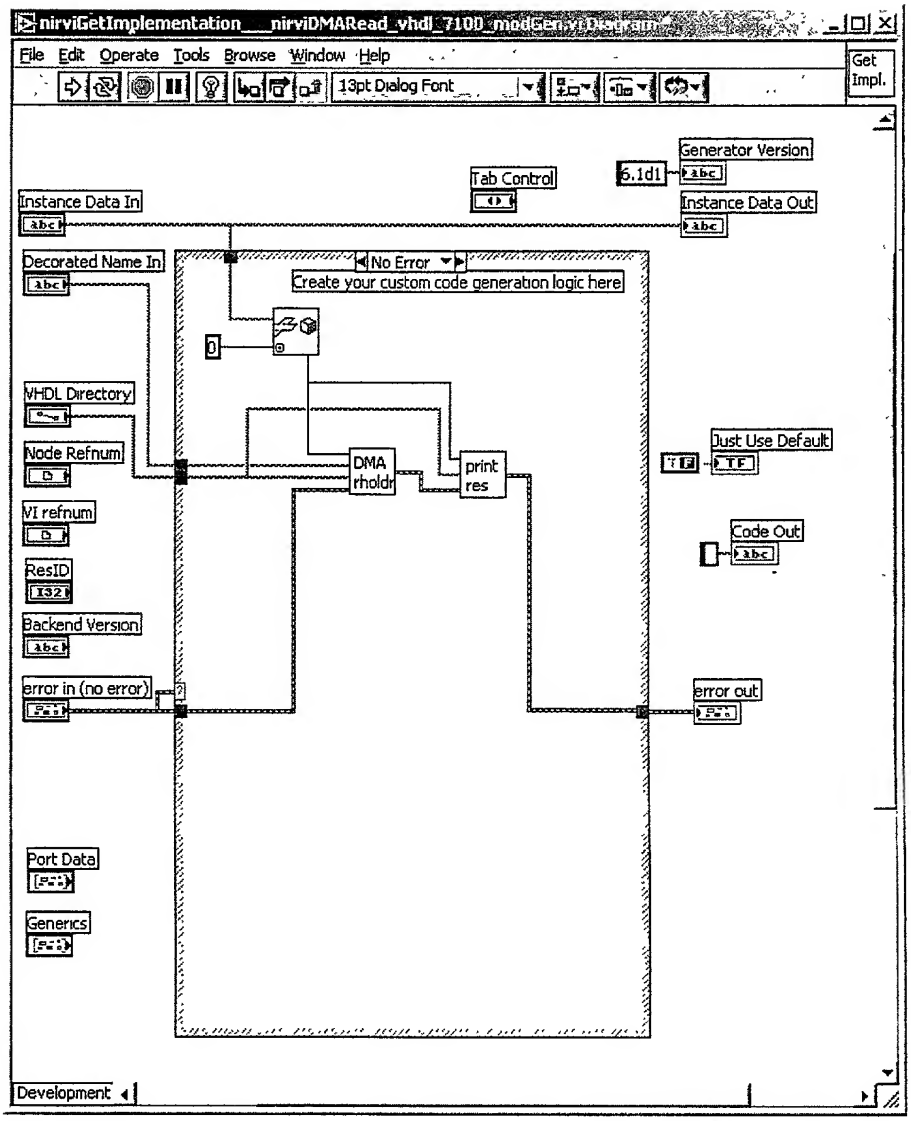
File Edit Operate Tools Browse Window Help
13pt Dialog Font
Get Impl.
Generator Version
6.1d1
Tab Control
Instance Data In
Instance Data Out
Decorated Name In
No Error
Create your custom code generation logic here
0
VHDL Directory
Node Refnum
VI refnum
ResID
Backend Version
error in (no error)
DMA rholdr
print res
Just Use Default
TF
Code Out
error out
Port Data
Generics
Development

Figure 21

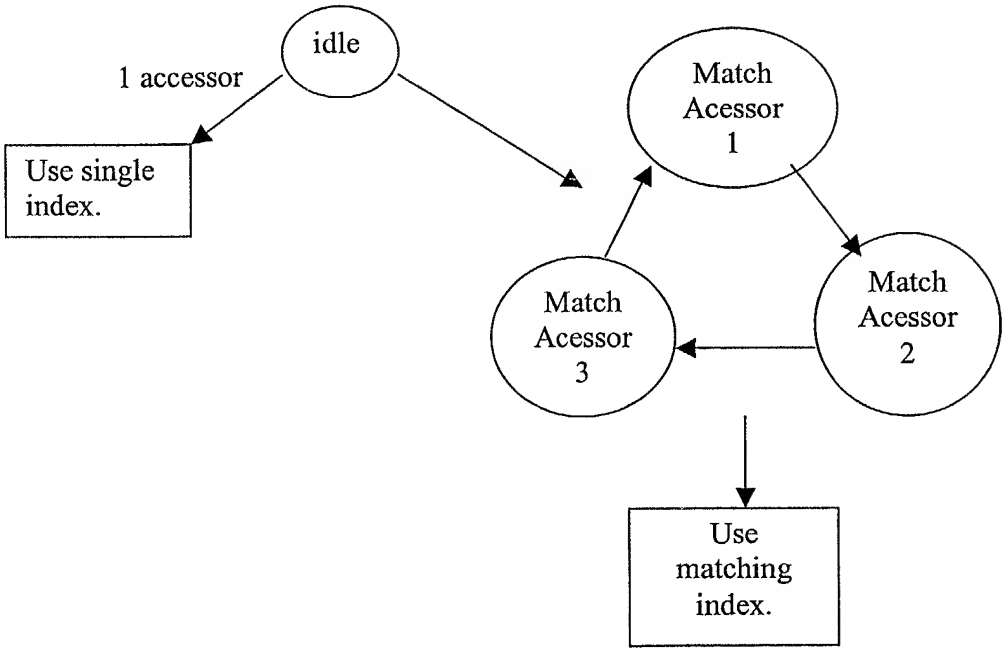
idle
1 accessor
Use single index.
Match Acessor 1
Match Acessor 2
Match Acessor 3
Use matching index.

Figure 22

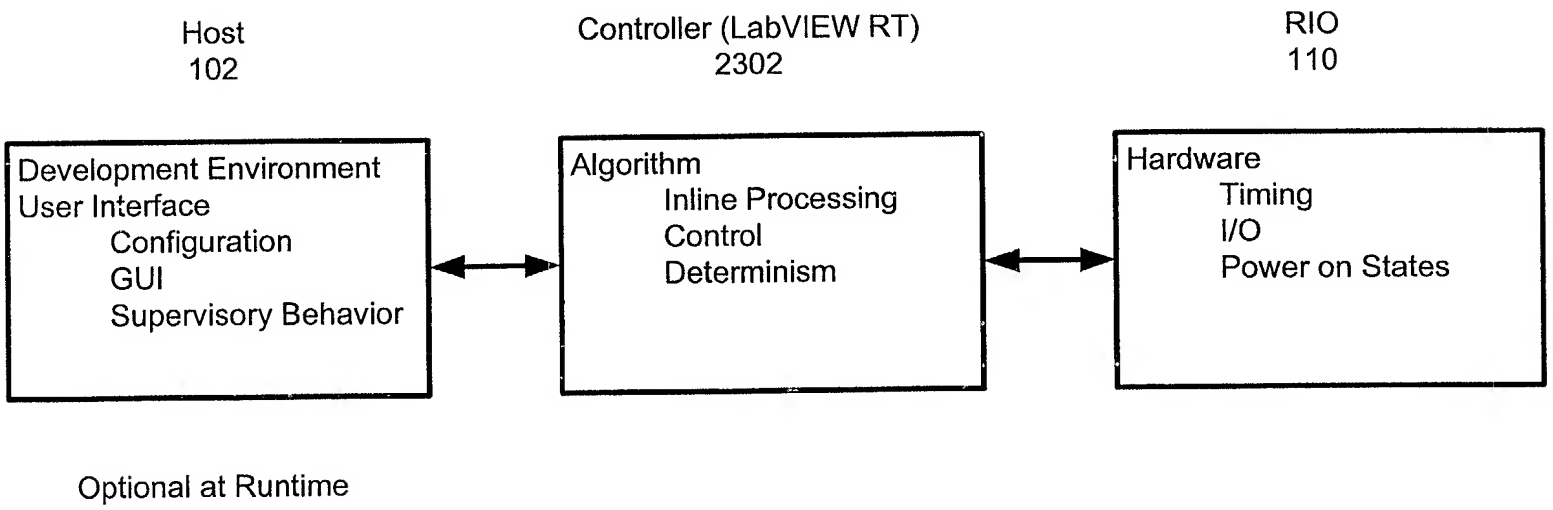
Host
102
Controller (LabVIEW RT)
2302
RIO
110
Development Environment
User Interface
Configuration
GUI
Supervisory Behavior
Algorithm
Inline Processing
Control
Determinism
Hardware
Timing
I/O
Power on States
Optional at Runtime

Figure 23A

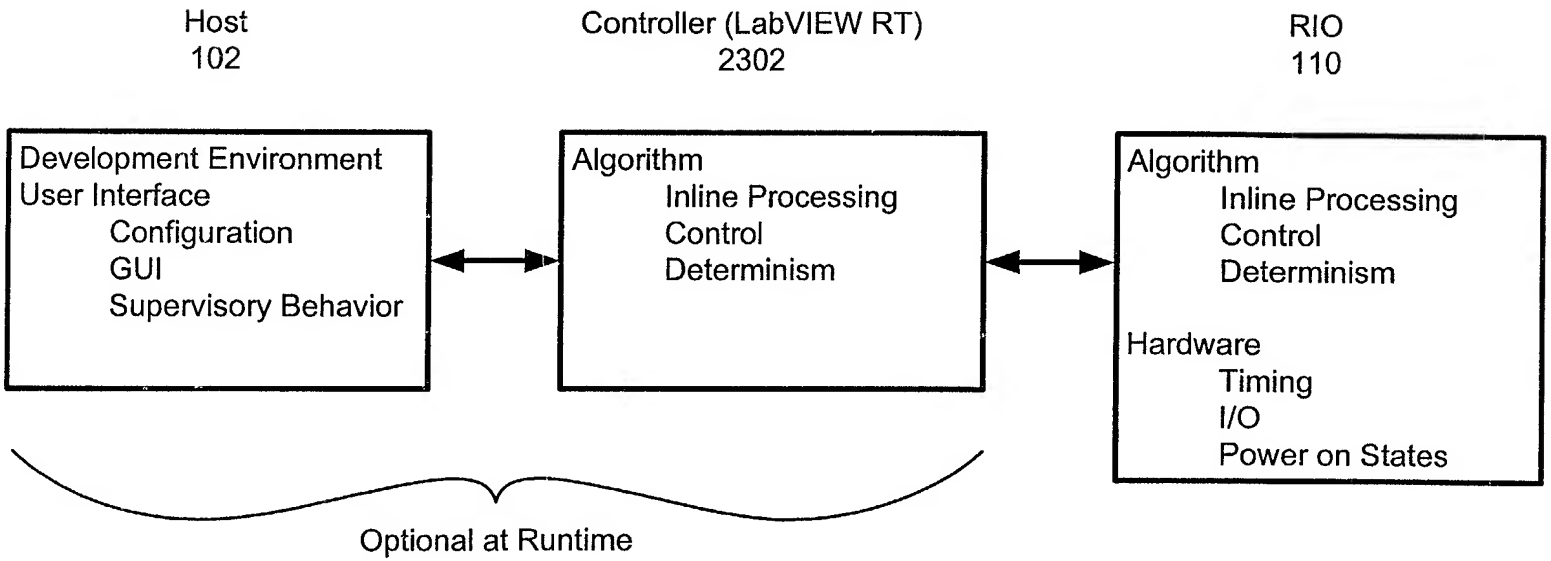
Host
102
Controller (LabVIEW RT)
2302
RIO
110
Development Environment
User Interface
Configuration
GUI
Supervisory Behavior
Algorithm
Inline Processing
Control
Determinism
Algorithm
Inline Processing
Control
Determinism
Hardware
Timing
I/O
Power on States
Optional at Runtime

Figure 23B

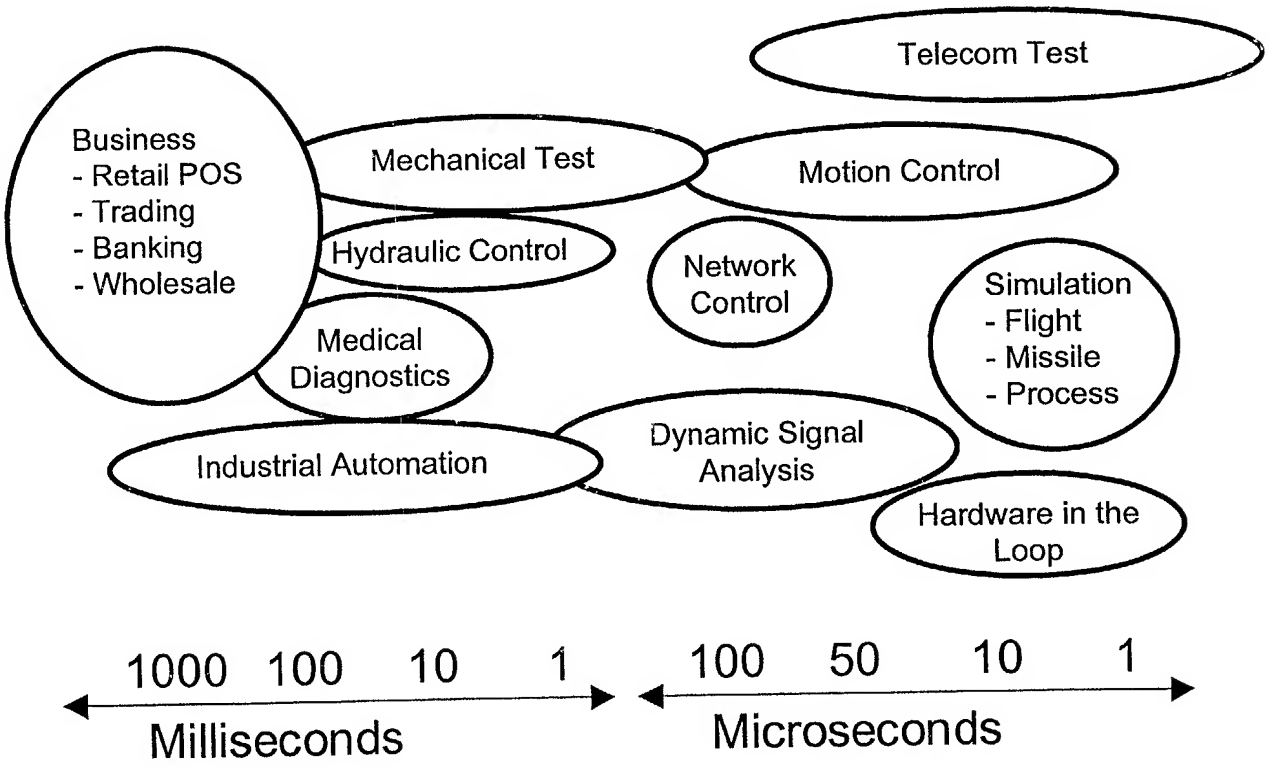
Telecom Test
Business
- Retail POS
- Trading
- Banking
- Wholesale
Mechanical Test
Motion Control
Hydraulic Control
Network Control
Simulation
- Flight
- Missile
- Process
Medical Diagnostics
Industrial Automation
Dynamic Signal Analysis
Hardware in the Loop
1000 100 10 1
Milliseconds
100 50 10 1
Microseconds

Figure 24